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AVIATION

The Oldest American Aeronautical Magazine

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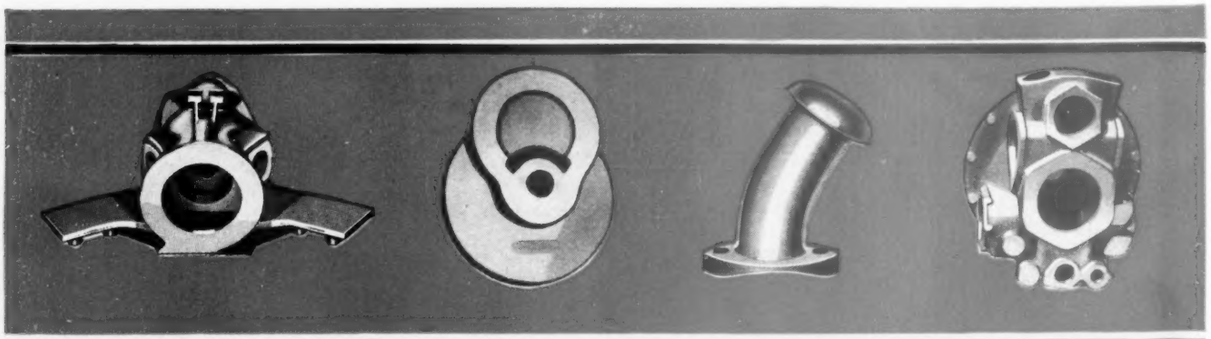
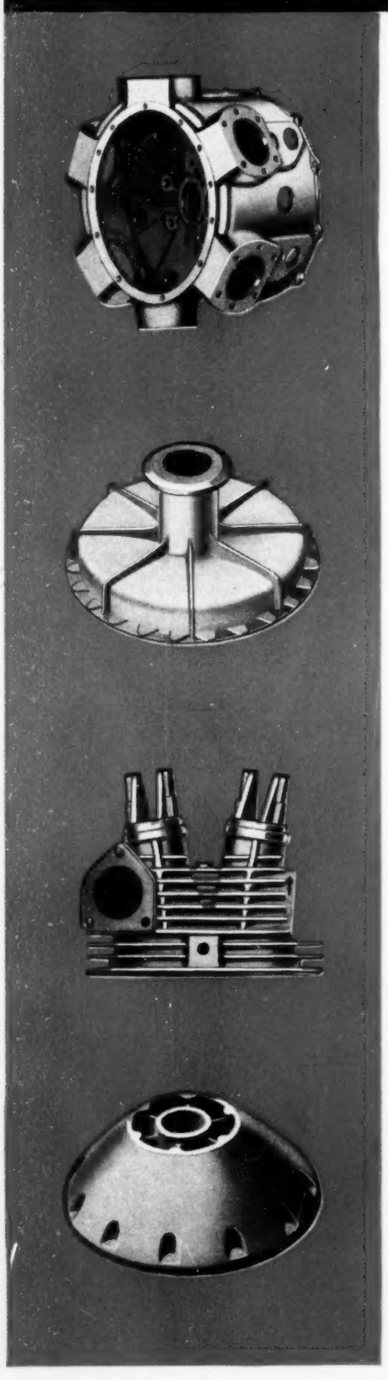
THE *New York* SHOW

State Control IN CONNECTICUT

Capital Investment IN THE INDUSTRY





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AVIATION

The Oldest American Aeronautical Magazine

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Volume 28, Number 18

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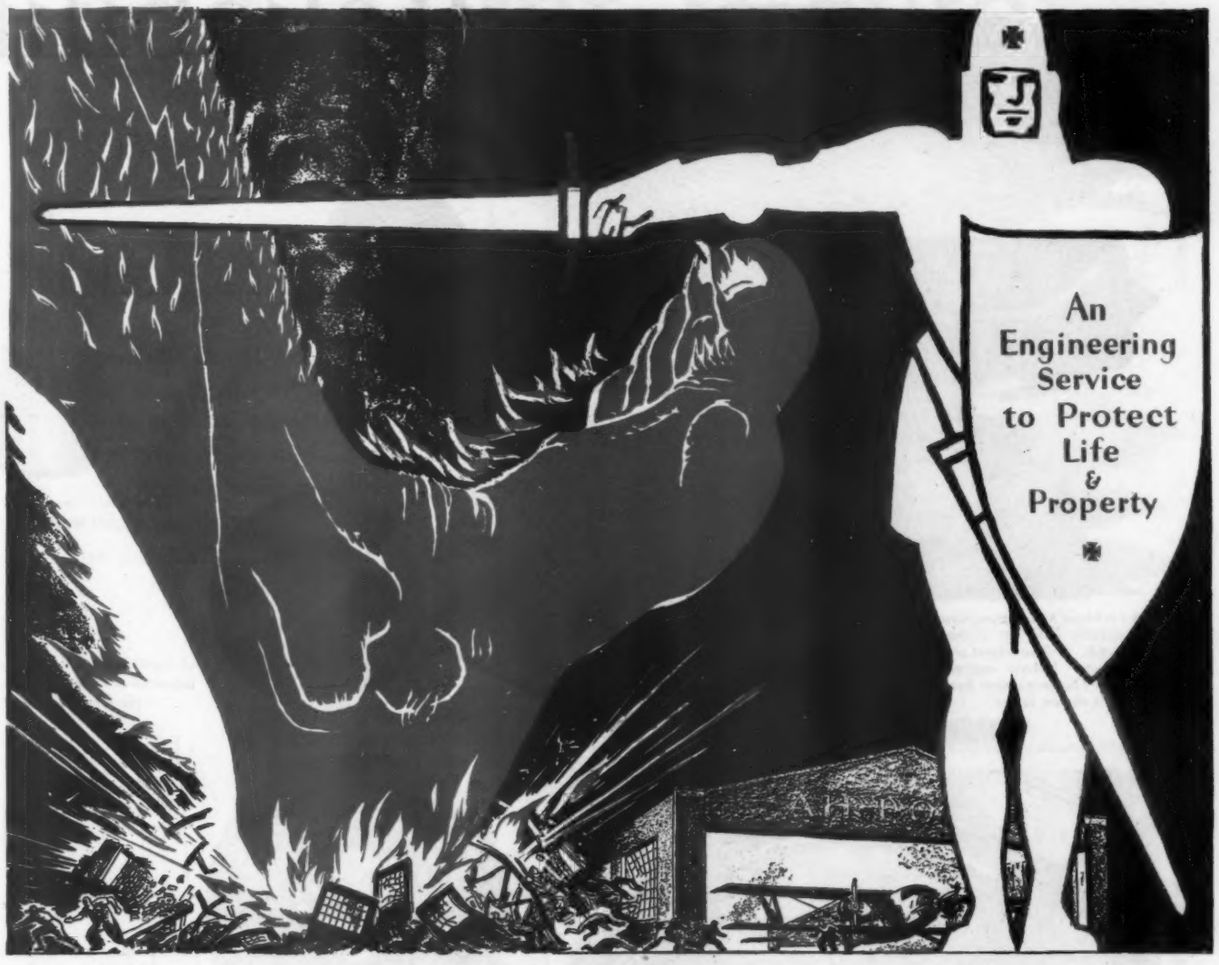

Sooner or later FIRE comes— Stop him!

You can't reason with Fire. And it's futile to say "We're careful here; we won't have a fire." For an airport with its crowded planes and inflammable oils and fuels offers a tempting prey for Fire to step on. Some day some one will be careless! Some day something will go wrong! An emergency will be upon you. Will it be an incident or a disaster?

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An interview with one of our fire protection engineers carries no obligation. Or write for "Sinister Beacons" a booklet describing airport hazards and how to protect them. American-La France and Foamite Corporation, Dept. T62, Elmira, N. Y. *Offices in all Principal Cities.*

LA FRANCE AND FOAMITE PROTECTION

AN ENGINEERING SERVICE

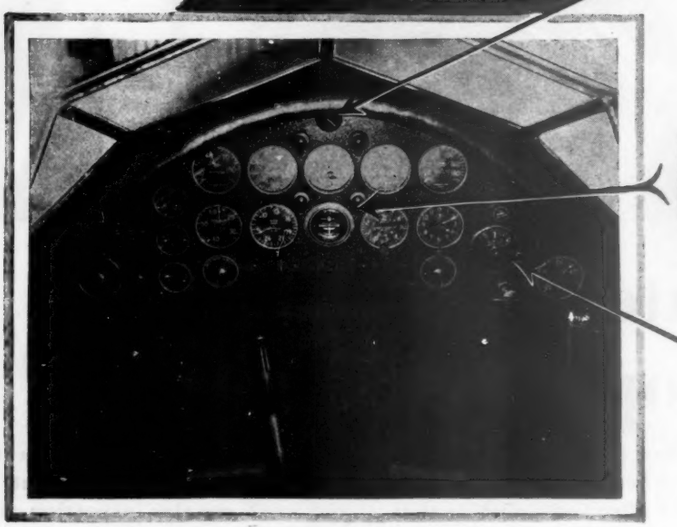
AGAINST FIRE

Reliability

This Lockheed Sirius monoplane was recently built for Colonel Lindbergh. It is equipped with the General Electric magneto compass. The instrument panel is shown below

The generating unit is the heart of the magneto compass

A controller provides sensitivity adjustment to suit the needs of the pilot in flight



The compass indicator is built to withstand severe vibration

The course-setting controller gives the pilot complete directional control

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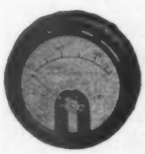
GENERAL

and Light Weight Distinguish GENERAL ELECTRIC EQUIPMENT

THE MAGNETO COMPASS combines reliability and light weight to a degree never before attained in an aircraft instrument of this character. For example, in the generating unit there are no universal joints; a damped pendulum system maintains proper relation with the earth's magnetic field and provides exceptional stability. Furthermore, directional indications depend upon the position of pole pieces—not the position of the brushes. The weight of the generating unit complete with wind-driven impeller is 5.6 lb. The accessories add about 6 lb.

THE CARD COMPASS admirably serves the need for an accurate instrument of moderate cost. A special vibration-absorbing bracket permits base, ceiling, wall, or panel mounting. Other features include: non-glare lighting; ground-glass lens; luminous dial and lubber line; and adjustable compensation. The weight complete is 1.9 lb.



THE ENGINE-TEMPERATURE INDICATOR enables the pilot to read engine temperature direct—regardless of the temperature of the oil supply or cooling liquid. It is accurate and reliable; it requires no battery; it is not connected with the ignition system. The weight complete is 1.2 lb.

THE OIL IMMERSION HEATER should be a part of the equipment of every hangar. It is suitable for connection to any standard electric-lighting circuit. Placed in the oil tank of an engine, it heats the oil properly and facilitates a safe, quick start.

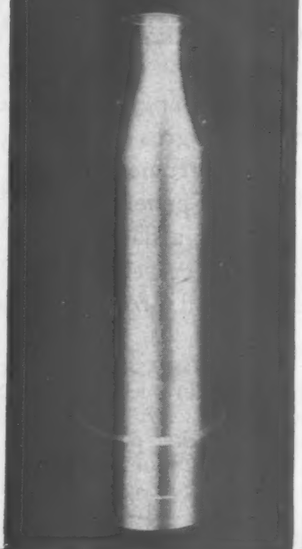
RECENT General Electric developments also include built-in, wing-type landing lights and radio-shielding ignition harnesses. For complete information, address the General Electric Company, Schenectady, N. Y.—manufacturer of lighting equipment, instruments for navigation and flight, engine accessories, and sundry devices for the aëronautic industry.

700-2

ELECTRIC

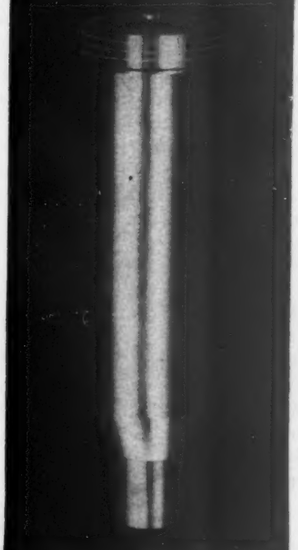
NO OTHER PART OF AN AIRPLANE IS MORE PRECISION-BUILT

THE cylinders of Aerol Military Struts are machined in one piece from a single chrome-nickel-steel extruded or tube forging specially heat-treated in modern electric furnaces under pyrometer control. The possibility of flaws in the metal or errors in heat-treating are eliminated.

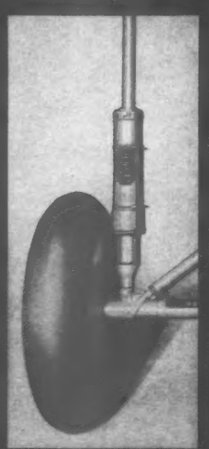


THE finished cylinder is exactingly machined to rigid limits. One one-thousandths of one inch is the maximum tolerance allowed, and rigid inspection prevents the passing of any cylinders not meeting these requirements.

THE piston assembly also represents the highest quality of materials and workmanship. The piston is made from special chrome-nickel-steel extruded or tube forging and the carefully fitted head is of slow-wearing gun metal. The special packing holds a perfect seal throughout years of active service.



THE finished strut combines fine materials, workmanship and superior design. No other type of landing-shock absorber can equal the operating efficiency and long life of these struts. That is why there are more Aerol Struts in use today than any other make.



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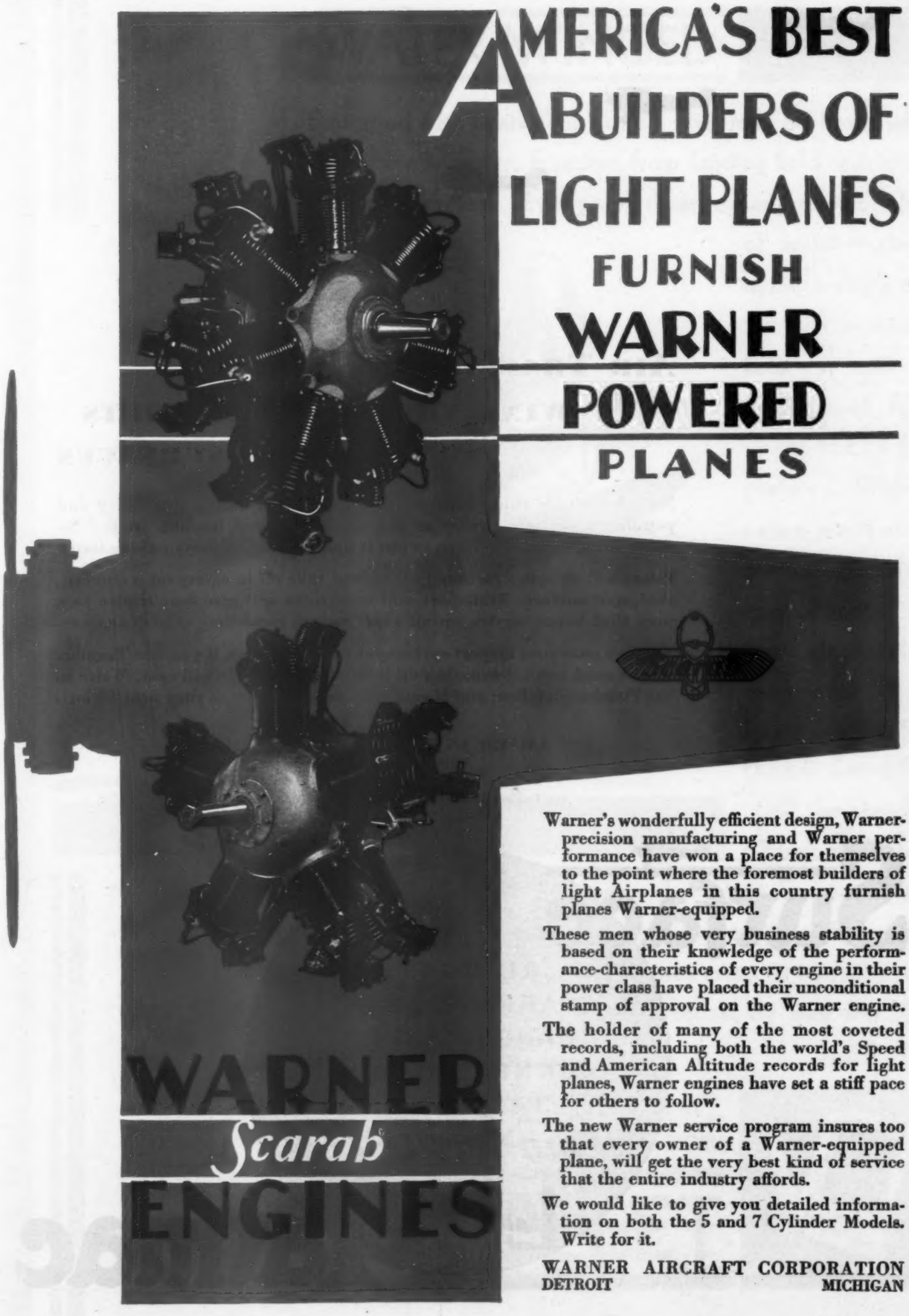
AEROL shock absorbing STRUT



AMERICA'S BEST BUILDERS OF LIGHT PLANES FURNISH WARNER POWERED PLANES

Warner's wonderfully efficient design, Warner-precision manufacturing and Warner performance have won a place for themselves to the point where the foremost builders of light Airplanes in this country furnish planes Warner-equipped.

These men whose very business stability is based on their knowledge of the performance-characteristics of every engine in their power class have placed their unconditional stamp of approval on the Warner engine.

The holder of many of the most coveted records, including both the world's Speed and American Altitude records for light planes, Warner engines have set a stiff pace for others to follow.

The new Warner service program insures too that every owner of a Warner-equipped plane, will get the very best kind of service that the entire industry affords.

We would like to give you detailed information on both the 5 and 7 Cylinder Models. Write for it.

WARNER AIRCRAFT CORPORATION
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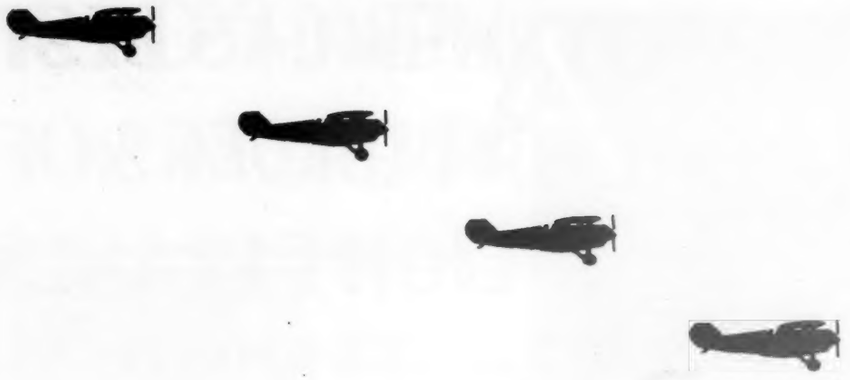

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WING THEIR WAY TO PORTS WITH PAVED SURFACES

No other single thing can contribute so much to the prosperity and popularity of your airport as paved runways and landing strips. No other thing can do so much to put it upon a busy, money-making basis.

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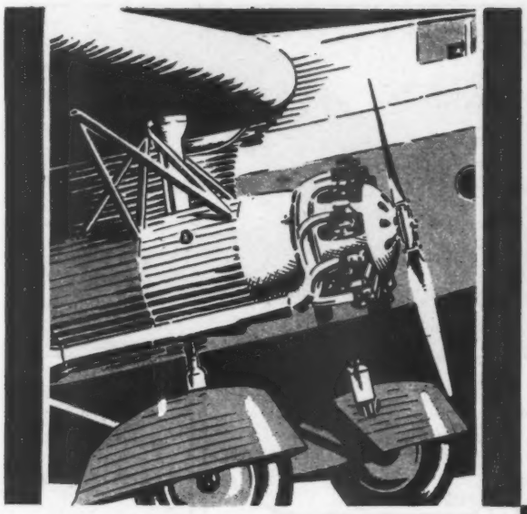
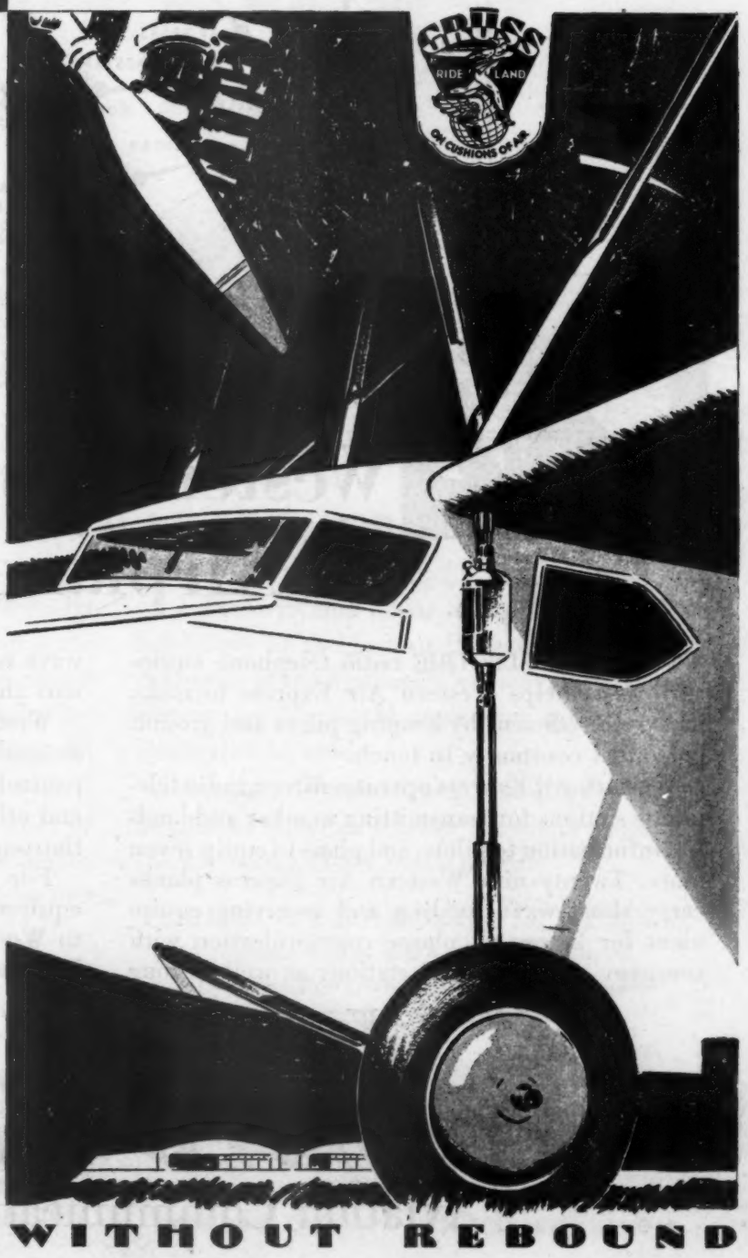
CONSOLIDATED AIRCRAFT CORPORATION, BUFFALO, N. Y.

THE COMMODORE



BRING YOUR AMPHIBION DOWN TO EARTH *on* GRUSS



A GOOD hull does not make an amphibion, nor two wheels a landing gear. Between the wheels and your five or fifty thousand dollar plane must be a shock unit to counteract landing impact and vibration. Upon the selection of this unit and its adaptability to your landing gear design depends the satisfaction of your customer.

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Western Air Express dispatchers talk at will with their pilots en route

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Western Air Express operates fifteen radio telephone stations for transmitting weather and landing information to pilots, and plans to equip seven more. Twenty-nine Western Air Express planes carry short wave sending and receiving equipment for 2-way telephone communication with company owned ground stations as well as long wave receivers which bring in radio beacon signals and government weather reports.

Western Electric equipment is light, compact, accessible, easily installed and arranged for remote control. It was selected by Western Air Express and other leading air lines because it has proved thoroughly dependable under all flying conditions.

For full information about radio telephone equipment for planes or ground stations, write to Western Electric Company, Dept. 247A, 195 Broadway, New York, N. Y.

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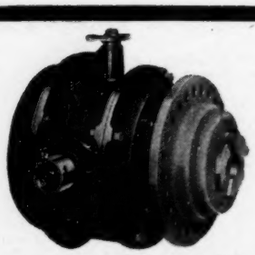

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Eclipse Aircraft Engine Starters and Generators are made for every aircraft requirement. They are precision built, are light in weight and constructed of specially selected materials.

Several types of starters are available—inertia, direct cranking, etc.—for electric and manual operation. The generators are built in various sizes and supply current for charging batteries, lighting, and radio.

Eclipse equipment is used on planes in the U. S. Naval and Military services, also on almost all planes engaged in Air Transport and other commercial operations.

For information on any specific installation, write to our engineering department.

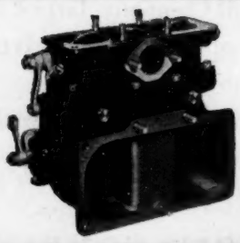
Eclipse Aviation Corp., East Orange, N. J.
(*Division of Bendix Aviation Corporation*)

Pioneer Instruments

As the mariner trusts his compass, so, too, the airplane pilot depends on his Pioneer Instruments. From these he knows his location, direction, speed—everything necessary for safe flying. Pioneer Instruments were an important factor in winning the world's record for sustained flight—420 hours.

Pioneer Instruments have been used by famous flyers, such as Lindbergh, Chamberlain, Brock, Schlee, Wilkins, Byrd, and others. They include a wide variety of oil and fuel gauges, thermometers, altimeters, speed and drift indicators, air logs and air speed indicators, navigating lights, parachute flares, etc., as well as the vital climb, turn and bank indicators and the famous earth inductor compass.

Pioneer Instrument Company
Brooklyn, N. Y.
(*Division of Bendix Aviation Corporation*)



Stromberg Carburetors for Aircraft

Practically every record flight has been made with Stromberg Carburetors. They were used by Lindbergh in his flight to Paris, by Byrd in flying over the North and South Poles, by the endurance plane, St. Louis Robin, and by many other famous flyers, such as Chamberlain, Wilkins, and Hawks.

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Stromberg Motor Devices Company
Chicago, Illinois
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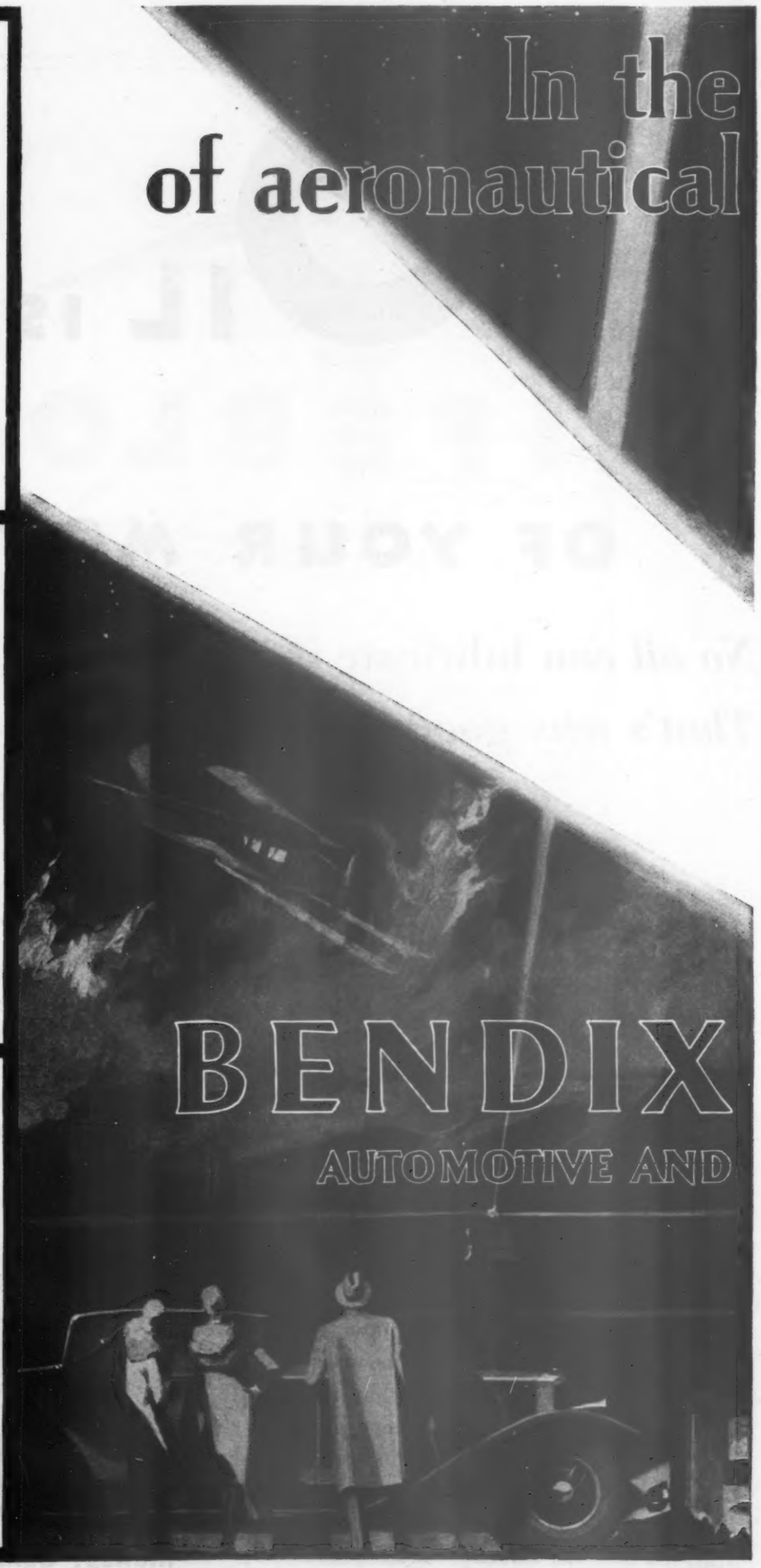

spotlight acceptance

On practically every ship displayed at the New York and other aviation shows you will find one or more Bendix Aviation Products.

There are Eclipse Starters and Generators, which have made starting the engine as easy as starting your car. There are Stromberg Carburetors, Scintilla Magnetos and Delco Ignition, which have given aviation engines the highest degree of dependability and performance.

There are Pioneer Instruments for accurate navigating, American Propellers for powerful, fast flying and Bendix Wheels and Brakes for safe landings and accurate ground maneuvers.

Every phase of airplane performance is vitally dependent on one or more units in the broad line of Bendix Products.

BENDIX AVIATION CORPORATION · CHICAGO · NEW YORK

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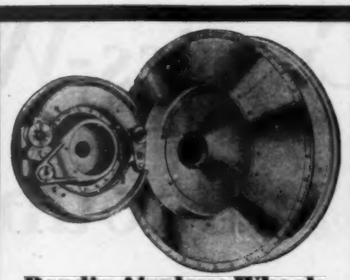

Bendix Airplane Wheels and Brakes

The great strength of Bendix Wheels and Brakes gives a pilot confidence in his ability to make a safe landing. Their streamline design offers minimum resistance in the air.

Bendix Brakes eliminate the need of a ground crew, and make any plane easier and safer to handle.

For the maintenance of brakes at the point of maximum efficiency, the Cowdrey Brake Tester excels. Its readings show the exact stopping force at each wheel, permitting effective brake action.

Bendix Brake Company, South Bend, Ind.
Bendix-Cowdrey Brake Tester, Inc.
South Bend, Ind.
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Magneto and Battery Ignition

In flying—where sure ignition is vital—Scintilla Aircraft Magnetos predominate in aviation today. Delco Ignition also plays an important part. Constantly in commercial, private and military flying—these Bendix-made units are proving their reliability.

Scintilla Magneto Company
Sidney, N. Y.

Delco Aviation Corporation
Dayton, Ohio
(Divisions of Bendix Aviation Corporation)

Paragon Propellers

Ships take off quickly—climb rapidly—when equipped with Paragon Propellers, because of the variation in pitch provided by their special blade outline.

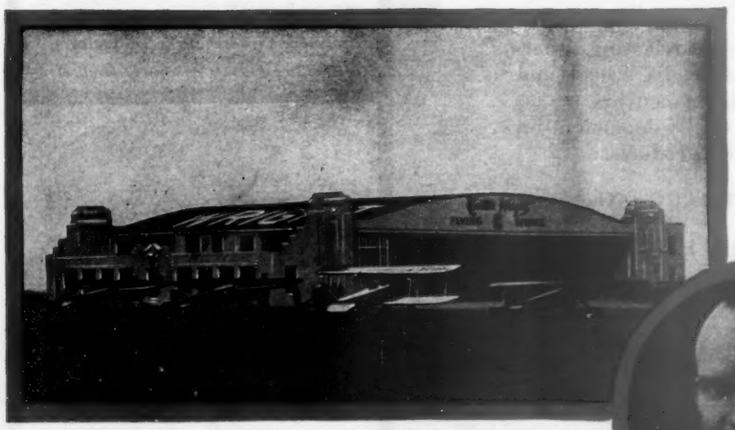
This feature means extra engine revolutions when engine speed is most vitally needed—revolutions that are remarkably free from vibration because of the care with which Paragon Propellers are built.

Selected materials are used exclusively. Laminations are carefully weighed, balanced and matched—then the whole propeller is balanced with the utmost precision.

Paragon Propellers insure that smooth flow of power which gives maximum performance. They are available through Paragon dealers at most principal airports.

The American Propeller Company
Baltimore, Maryland
(Division of Bendix Aviation Corporation)

Curtiss-Wright Flying Service announces the opening of *Oklahoma City's Model Airport*



New Curtiss-Wright $100,000 hangar at Oklahoma City

Curtiss-Wright Flying Service invites members of the aeronautical industry and the flying public to inspect and utilize the services of Oklahoma City's Model Airport.

B. S. GRAHAM

Major B. S. Graham, General Manager of Curtiss-Wright $250,000 Oklahoma City Airport

Oklahoma City's Model Airport, newly opened by Curtiss-Wright Flying Service, takes rank among the country's leading flying fields and service centers.

The field, which covers one hundred and sixty acres and is free of hazards, is located eight miles north of Oklahoma City on K. C.-Dallas lighted airway. Transportation to the city is afforded over arterial highway.

Among the airport's features is a new, completely modern Curtiss-Wright hangar, with attractive offices, pilots' lounge, students' lounge, classrooms and shops.

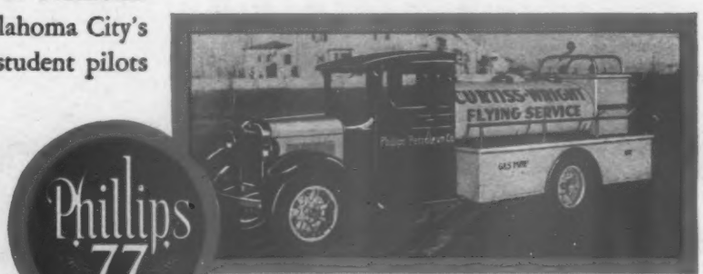
Ideal climate, the well-known hospitality of Oklahoma City and fine facilities combine to make Oklahoma City's Model Airport exceptionally popular with student pilots and mechanics.

Services

Sale of Curtiss-Wright ships and engines.
Service and repair of ships and engines.
Pleasure and taxi flying.
Flying and mechanical instructions.

Phillips '77' Aviation Gasoline used exclusively at new airport

In keeping with the high standards of service rendered by the Curtiss-Wright Flying Service, Phillips '77' Aviation Gasoline has been selected for exclusive sale and use at Oklahoma City's Model Airport.



Phillip's rapid service truck dispensing Phillips '77' Aviation Gasoline

THE DEPENDABILITY OF ADVERTISED PRODUCTS

ONLY dependable advertised products are offered to customers by the General Electric Supply Corporation.

The names are familiar throughout the industrial world — General Electric EDISON MAZDA lamps, Trumbull switches, Ivanhoe, Curtis X-Ray and Holophane lighting equipment and many others... and all standard General Electric apparatus and supplies, of course.

You have confidence in these dependable names. You know that the manufacturers are alert, responsible and progressive... that they are proud of their products and willing to stand back of them. You know that the products themselves give long, economical, trouble-free service.

Important to you also is the assurance that you can *depend* on prompt delivery of these materials and supplies. Your plant is within a few hours — or minutes — of adequate stocks, maintained at more than 80 different points throughout the United States. *Special delivery service* from the house nearest you enables you to secure supplies and materials exactly when you want them. When you have an electrical need—*write!*

. . to serve better the electrical needs of America

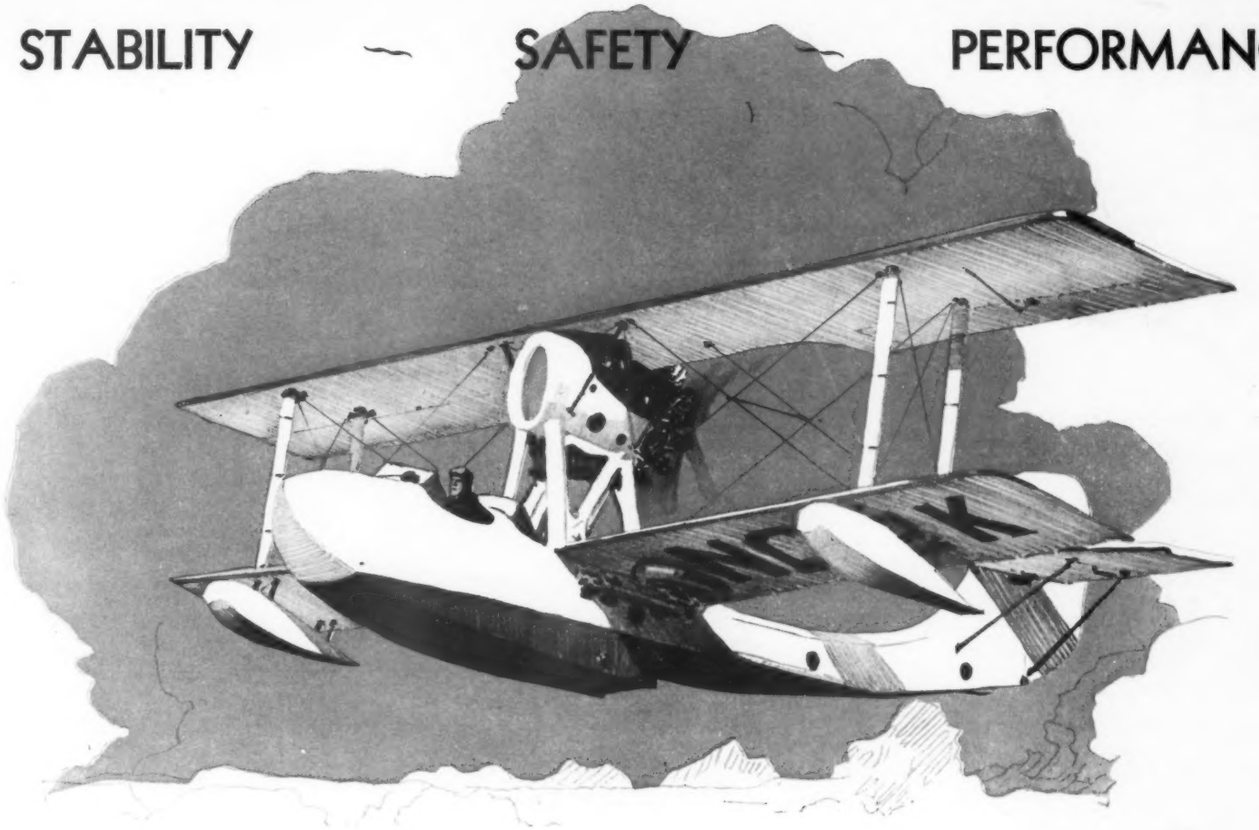
Join us in the General Electric Hour, broadcast every Saturday evening over a nation-wide N. B. C. network.

GENERAL ELECTRIC
SUPPLY CORPORATION

GENERAL OFFICES BRIDGEPORT, CONNECTICUT

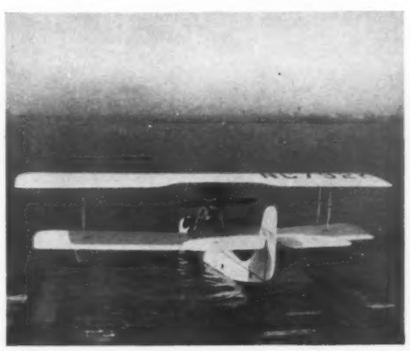
SAFETY CHUTE
The Ace of Parachutes
SAFETY CHUTE LANDS VERNE TREAT INTO CATERPILLAR CLUB
(From Verne Treat's Official Report of forced jump while flying night mail March 25th.)
"A SAFETY CHUTE was being worn, and it certainly worked fast. I don't believe I dropped over a 100 ft. before it opened. On the way down practically no oscillation was noticeable although the air was very rough."
This Chute was one of a rush order we delivered to Eastern Air Transport, Inc., only a few days previous to Pilot Treat's forced jump . . . We can also give you quick service on SAFETY CHUTES.
Used by Department of Commerce Officials and Many Famous Flyers
Every Pilot should own a SAFETY CHUTE. Smaller, more compact and comfortable . . . of proved quicker opening. Write for illustrated folder and special offer.
We also manufacture
Snappy-Snug Flying Togs—Helmets
Safety Belts — Wind Cones — Etc.
SWITLIK PARACHUTE & EQUIPMENT CO.
TRENTON NEW JERSEY

STABILITY — SAFETY — PERFORMANCE



On the Water and In the Air

"A flying boat must have essentially the same qualities which yachtsmen appreciate in a well built boat" says Louis Schreck, designer of the



Viking. "Safety should not be sacrificed for speed . . . stability both on the water and in the air must be the objectives of aeronautical engineers when a flying boat is to be constructed."

A Safety Record

You will better appreciate the safe flying qualities of the Viking Amphibian or Flying Boat when you know that this plane is the American version of the Schreck F.B.A.—a plane with a record of 6,000,000 miles behind it without a structural accident . . . a plane that is used as standard equipment in the French Navy.

Fine Performance

In terms of stability, safety and performance the Viking is not equalled by any other flying boat in the same price range. Here is a moderately sized plane equipped with a Wright J-6, 225 h.p. engine, capable of 102 miles per hour. She gets off the water like a shot, climbs 600 feet a minute into the air and will cruise 350 miles without refueling.

Seaworthy — Airworthy

But above everything else the Viking is a plane designed for safe flying and is able to withstand strenuous use on the water and in the air. Seven different kinds of wood are used to build her. We shall be glad to send you full particulars about this flying boat. Write to

THE
VIKING FLYING BOAT COMPANY
89 SHELTON AVENUE, NEW HAVEN, CONN.
or Miami Hangar, CAUSEWAY ISLAND, Miami, Florida

Specifications of the Viking Flying Boat

High Speed, 102 m.p.h.; Cruising, 80 m.p.h.; Landing, 40 m.p.h.; Climb (at Sea level), 600 ft. per min.; Service Ceiling, 14,000 ft.; Fuel Capacity, 50 gals.; Range, 320 miles; Duration, 4¾ hours; Length, 29 ft., 4 in.; Height (on wheels), 11 ft., 3 in.; Span, 42 ft., 3 in.; Wing Area, 448 sq. ft.; Capacity, 4 persons; Engine — Wright J-6, R760, 225 h.p.

THE VIKING FLYING BOAT

THE KITTYHAWK... *A Plane for Safe Flying Over Land and Sea*

THE Kittyhawk is ever ready to soar into the skies from landing fields of green . . . ever eager to climb on up into the clouds from waterways of blue. For this flying symbol of freedom, safety and power can be changed from a land plane to a sea plane quickly and easily, as simply as you change a tire. The regular landing gear can be removed and floats attached when necessary.

For Safe Flying

The Kittyhawk is approved by the Department of Commerce both as a land plane and as a sea plane and is noted for its exceptional safe flying qualities. She is almost impossible to spin, so easy to fly, so responsive to the controls. No wonder this is an ideal plane for training purposes, such an asset to the business man who wants to go or ship things from one place to another speedily and safely. As a land plane, the Kittyhawk leaves the fleetest train far behind; as a seaplane, she outpaces the fastest power boat that rides the waves.

Fine Performance

The Kittyhawk seats three persons, carries a greater load than any other biplane its size, cruises at ninety and develops one hundred and ten miles per hour when required. She has the ability to climb twelve hundred feet per minute. Few planes in the same price range if any, can equal her performance and maneuverability under any and all conditions.

The Kittyhawk is the companion plane to the Viking Amphibian and Flying Boat. We shall be glad to send details about both planes upon request.

THE VIKING FLYING BOAT COMPANY

89 Shelton Avenue . . . NEW HAVEN, CONN.

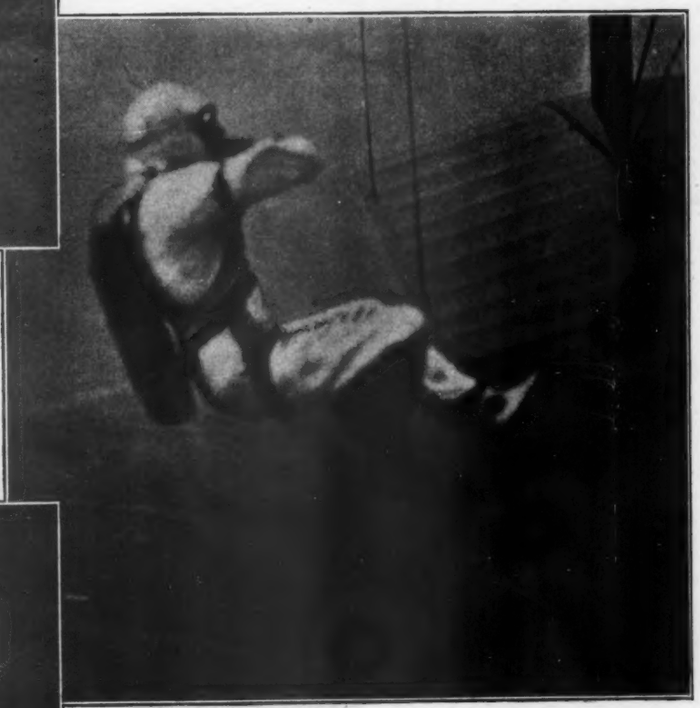
or MIAMI HANGAR, CAUSEWAY ISLAND, MIAMI, FLORIDA

Specifications of the Kittyhawk

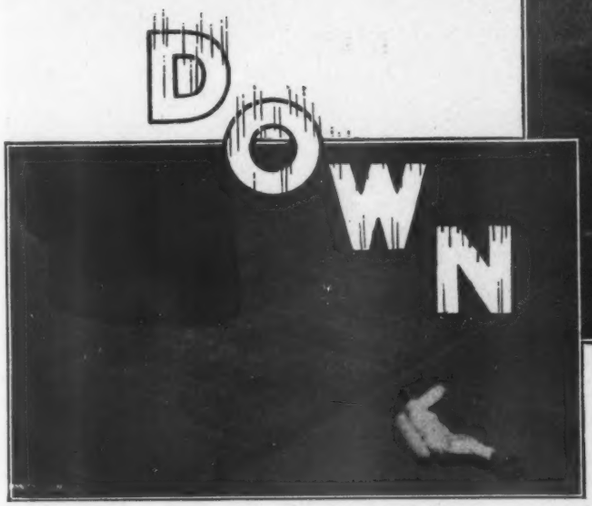
Engine—Kinner K-5, 100 h.p.; Approved Type Certificate No. 166; Length overall, 22 ft., 11 in.; Height overall, 8 ft., 8 in.; Span both wings, 28 ft.; Chord both wings, 4 ft., 6 in.; Wing area, 233.4 sq. ft.; Weight empty, 1107 lbs.; Useful load, 768 lbs.; High Speed, 110 m.p.h.; Cruising Speed, 90 m.p.h.; Landing Speed, 38 m.p.h.; Climb, 1200 ft. p.m.

What Every Flying Man Knows:

—*Any way out*



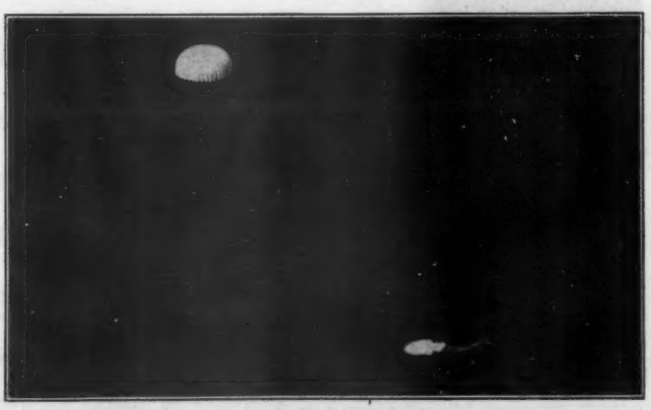
is a safe way



with his reliable

IRVIN

The Life-Preserver of the Air



HEAD first... feet first... step off... lift off... throw out... slip out—any way out... of a ship in thin air;—when this comes in the order of events, be thankful for your IRVIN!

Already, in emergencies, it has saved over 300 lives, including those of many of the most famous of all fliers. Already indeed, it has won for itself the merit award of universal recognition as the standard aerial life-saving equipment of the world.

IRVIN Air Chutes for every purpose are available in all parts of the country. Ask your dealer, or address below. Dealers should write the company direct.

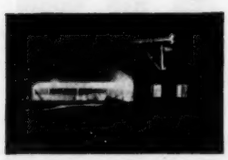
"Happy Landings", our motion picture on standard width film, showing IRVIN Air Chutes in action, is available free of charge to schools, clubs and organizations interested in aviation. Send for booklet and particulars.

IRVING AIR CHUTE CO., Inc.
372 Pearl St., Buffalo, N. Y.

West Coast Factory and Office:
Grand Central Air Terminal, Glendale, Calif.

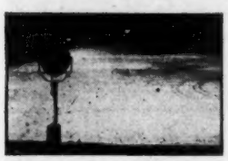
1001

It's Albany...



Hangar Floodlighting

Field Floodlighting



Field Floodlighting

You'll find Albany airport "on the map" by night as well as by day . . . thanks to Graybar Airport Lighting. This well-lighted field stands out as a haven for the night-flyer . . . and as another example of Graybar's coast-to-coast experience in

TUNE IN ON THE GRAYBAR HOUR, 10 TO 10:30 P. M. EASTERN DAYLIGHT SAVING TIME, EVERY TUESDAY . . . COLUMBIA BROADCASTING SYSTEM

lighting the nation's leading flying fields.

. . . Graybar's Lighting specialists will be glad of the opportunity to work with you on your preliminary plans for airport lighting. (Send the coupon for further information along this line.)

OFFICES IN 76 PRINCIPAL CITIES . . . EXECUTIVE OFFICES: GRAYBAR BUILDING, NEW YORK, N. Y.

GraybaR

AIRPORT LIGHTING

COUPON

Graybar Electric Co., Graybar Bldg., New York. Av. 5

Gentlemen: Please send us more information on Airport Lighting.

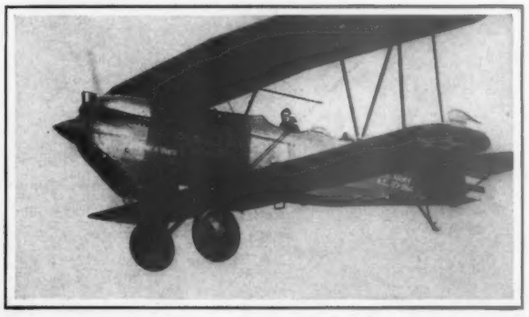
NAME_____

ADDRESS_____

PURSUIT—Curtiss P-1C

ON THE

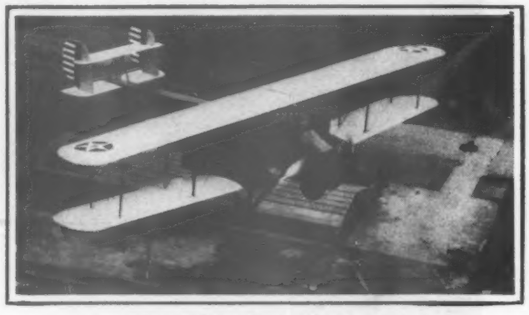
The Annual Air Corps Maneuvers



OBSERVATION—Curtiss O-1E

AT Mather Field, California, the U. S. Army Air Corps has just completed its annual Air Maneuvers. The crack fighting units of the Air Corps, with more than 160 of its finest planes, participated, for the Maneuvers represented both an intensive study of tactical problems and a thorough demonstration of the year's progress in the training of personnel and the development of equipment.

For the first time in Air Corps history, all four offensive branches of Army Aviation—Pursuit, Observation, Attack, and Bombardment—were combined in the Maneuvers. *In all four branches* Curtiss military aircraft (and Curtiss engines) are standard fighting equipment of the Air Corps. The Curtiss P-1C Pursuit, the O-1E Observation, the B-2 Bomber, and the A-3B Attack types, constituted more than 50% of all aircraft taking part in the Maneuvers. No other aircraft manufacturer was represented at the Maneuvers in more than one branch. These figures are convincing evidence of the versatility and effectiveness of the Curtiss Group Engineering System in producing high-performance aircraft to meet the exacting requirements of Military Aviation.



BOMBARDMENT—Curtiss B-2

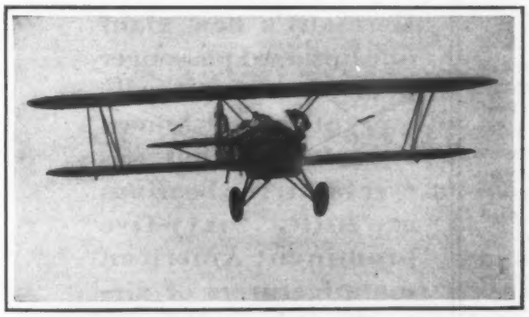
CURTISS AEROPLANE &

Offices: GARDEN CITY, N. Y.

A · DIVISION · OF · CURTISS ·

WESTERN FRONT

THE MANEUVERS—a striking aerial photograph showing some of the 160 planes taking part in the Maneuvers, flying over Mather Field. All of the aircraft in the picture are Curtiss-Wright products.



ATTACK—Curtiss A-3B

P.S. And "behind the lines" here in the Experimental Laboratories at Garden City, Curtiss engineers, in co-operation with the Air Corps, have just produced the XBT-4, a new Basic Training plane powered with the Curtiss D-12 engine. In addition, they are busily engaged in the development of several new types of fighting aircraft, still finer than those now in service. Next year's Maneuvers will again reflect the progress that is vitally necessary to continued supremacy of our air forces.

MOTOR COMPANY, INC.

Factories : GARDEN CITY and BUFFALO, N. Y.

W R I G H T · C O R P O R A T I O N

149 SKF BEARINGS

are on this, the Largest Airplane in the World

NO time to think about bearings ... not when the altimeter registers ten thousand feet ... not when a hundred trusting passengers are dozing in their seats behind.

No time to *wish* that the bearings had been purchased upon performance rather than upon price ... not when the twelve roaring motors on the wing will continue to roar *only* so long as the bearings stand up ... nor when the twenty-four engine generators are running on them, and lighting dynamo, radio installation and fuel pump depend upon them.

The DO-X

Germany's giant 100 passenger plane is powered with 12 SKF equipped Siemens Jupiter* engines. SKF Bearings take the propeller thrusts and are on the crankshafts, Farmantype reduction gears, magnetos, lighting dynamo, radio and Lenz pump—a total of 149.

*NOTE: Recent press dispatches state that 12 SKF equipped Curtiss-Wright engines will be installed for the Trans-Atlantic flight of the DO-X.

And so in the DO-X, Germany's new giant one hundred passenger plane, as in practically every other well-known aircraft unit that was ever built, the bearings are SKF. Sixty-five prominent American manufacturers of aircraft and equipment alone use SKF Anti-Friction Bearings. SKF Industries, Inc., 40 East 34th St., New York, N.Y.

SKF

2479

THE HIGHEST PRICED BEARING IN THE WORLD

Just as light as they can be—just as strong as they should be. That's the combination which has made Kelsey-Hayes aircraft landing wheels the standard equipment of the industry.

Kelsey-Hayes Service is World-Wide

AIRCRAFT DIVISION

Kelsey-Hayes Wheel Corporation, Detroit, Michigan

Affiliated Divisions:
Kelsey Wheel Company, Ltd., Windsor, Ont.; Wire Wheel Corp. of America, Buffalo, N. Y.; Kelsey Wheel Co. Inc., Memphis, Tenn.

KELSEY-HAYES

AIRCRAFT LANDING WHEELS

CYLINDERS MACHINED

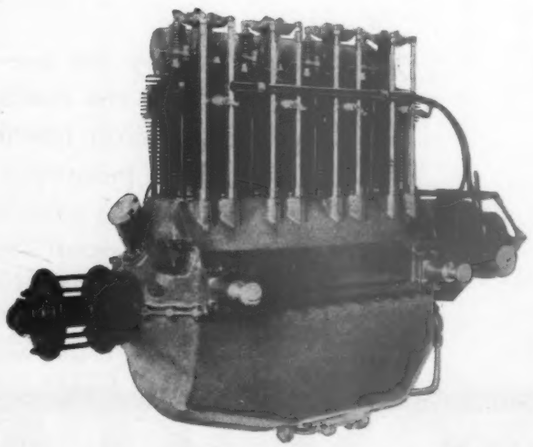
READY for assembly—a constructive help to the motor manufacturer requiring expert advice and manufacturing.

The casting of air-cooled cylinders requires a profound knowledge of foundry and metallurgical technique. S. Cheney and Son have behind their present organization 25 years of active operation in this most specialized field.

Such co-operation and experience is readily available to any responsible manufacturer. Tell us your requirements with blue prints—we will do the rest.

Users of Cheney-Cast-Cylinders

Aeronautical Corporation of America
Crosley Aircraft Co.
Century Rotary Motor Corp.
H. H. Franklin Manufacturing Co.
Hurricane Motor Co.
Wright Aeronautical Corporation
Menasco Motors Inc.



Illustrations show the Wright Gipsy cylinder and the Gipsy motor.

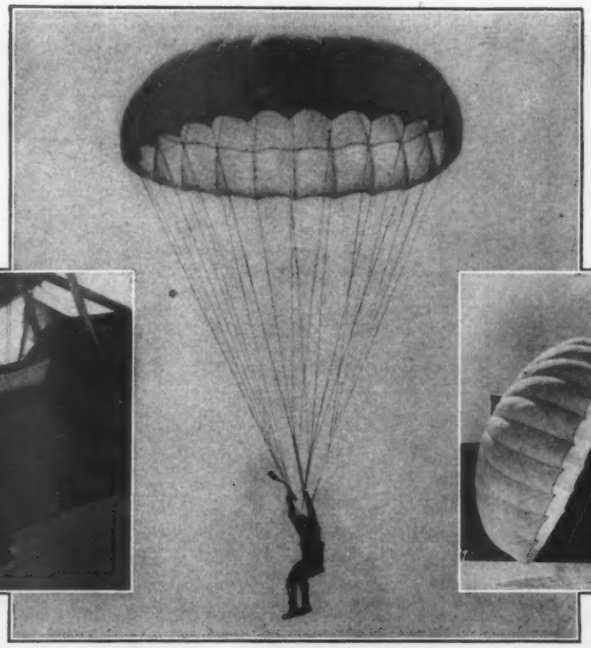
We are ready to furnish castings, patterns and castings or machined cylinders.

S. CHENEY & SON
MANLIUS, N. Y.

CHENEY ~ CAST ~ CYLINDERS

202 *High Strength ~ Low Cost*

Floyd Smith, pilot for nearly 20 years, wearing his compact Safety Chute, stepping into plane. Note the trimness of this pack.



(Left) Floyd Smith Safety Chute in action, approaching the ground. (Below) Chute opened, in front of Administration Building, Buffalo Airport.

Floyd Smith Safety Chutes

Pertinent facts you should read, behind the evolution of these advanced aerial life-savers, by Floyd Smith, first one to produce a free-type, manually-operated parachute.

IN 1912 I built a tractor biplane, flew it successfully at many exhibitions — until I met a cyclone at Hoisington, Kansas.

From that encounter I was fortunate to get out with my life —for I crashed from 1,000 feet. Since then, for 18 years, I have flown thousands of miles, piloted scores of kinds of aircraft — and studied constantly how to save the lives of those aloft should it be evident the ship for any reason, would do as mine did in that Kansas corn field.

In this, my interest naturally revolved around parachutes.

Early in 1914 both my wife and I had jumped from a plane—using a type of parachute attached to the plane itself.

But I saw that this arrangement was not practicable. Then, in mid-summer that year while I was looping, a wing collapsed —and at that moment there came to me, clear cut, the vision of the present free-type, manually-operated parachute pack. It all looks simple now.

But there were years of baffling problems. Even when General Mitchell's cable came from the front in France, to the U. S. War Department to place me on parachute duty, to work out my ideas, it was just another beginning in an unprecedented field.

FLOYD SMITH
President

Then, after months of experimental engineering at McCook Field, more months in the Aircraft Production office, there came the day in 1919, while in the Air Service Engineering Division, that the *first "live" jump in the world was made in a free type manual parachute*—and that in the one I had evolved.

Constant improvement from that day to this makes the new Floyd Smith Safety Chute one that every air operator should see. I am now in position to supply this, on receipt of order, to the commercial aviation interests of the country from the business in which I am here engaged with the finest facilities in the world at my command for producing parachutes.

For immediate delivery of these improved Floyd Smith Safety Chutes—write or wire today. Dealers will be interested in our "Parachute Proposition".

F S

Floyd Smith
SAFETY CHUTE COMPANY
528 GENESEE BLDG., BUFFALO, N. Y.

17

ALL SET

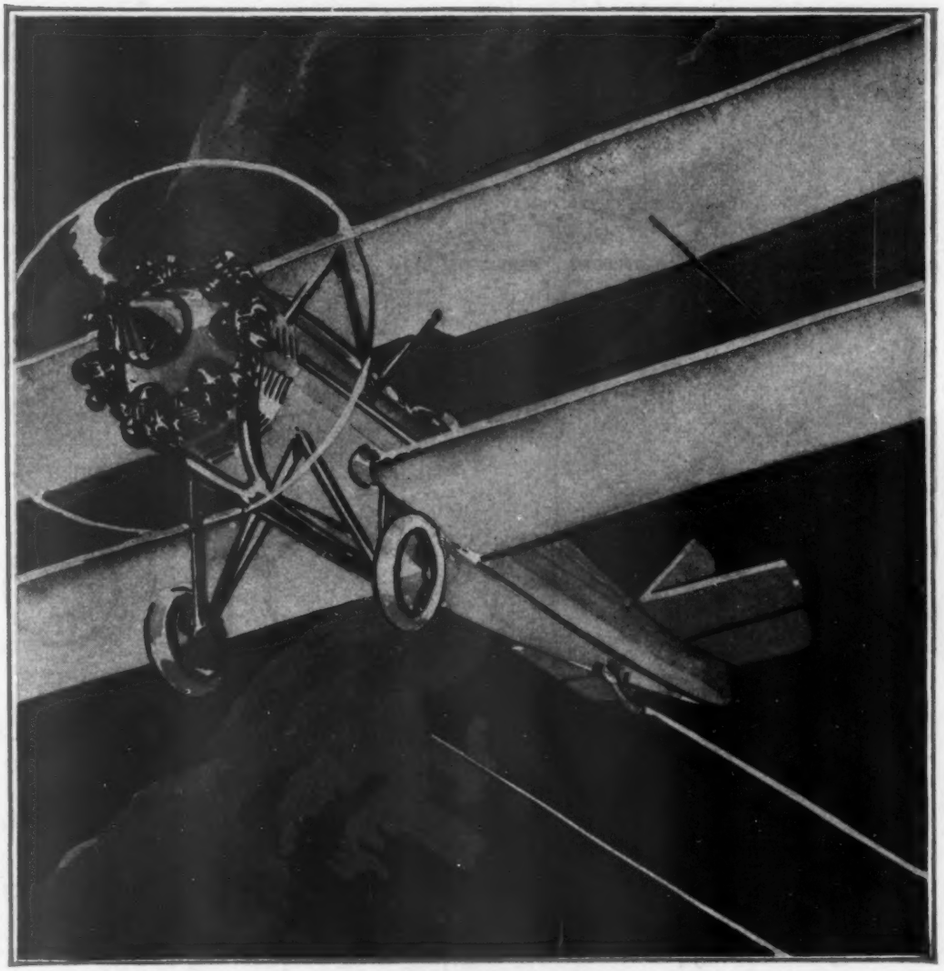
IN dependability, in sheer capability to stand the gaff of the toughest kinds of flying, Skelly Airplane Oil is ranked by none. And its flying mate, Skelly Aerodynamic Gasoline, comes through with the reserve power that pilots like so well in the take-off, in climbing, in stunting, and cruising. "All set" with Skelly products means pilots and mechanics are confident of easy going aloft. Confidence like that is sure proof that Skelly quality in the air has duplicated its popularity on the ground.

AVIATION SALES DEPARTMENT
SKELLY OIL COMPANY
TULSA, OKLA.

SKELLY AERODYNAMIC GASOLINE

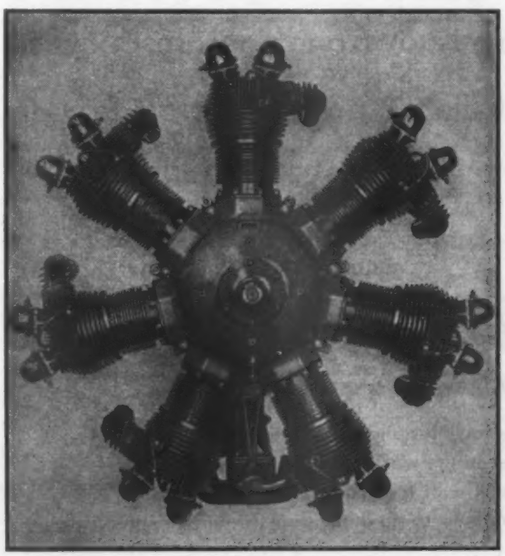
SKELLY AIRPLANE OIL

SKELLY



SWALLOW

----adopts AXELSON ENGINES *exclusively*



Completing exhaustive tests extending over a period of several months, the Swallow Airplane Company of Wichita, Kansas, has completed arrangements whereby Axelson Airplane Engines will be used exclusively in the Swallow 3-Place Training Bi-plane and the Swallow 2-Place Sport Bi-plane. This combination will permit greatly reduced production costs by Swallow and Axelson and will identify Swallow Planes as the outstanding product in their class.

The Axelson 7-Cylinder Airplane Engine is manufactured under approved Type Certificate No. 16.

Axelson Aircraft Engine Company
General Offices and Plant: Randolph St. at Boyle Ave.
LOS ANGELES, CALIFORNIA

. . . . . ECONOMY

Economy embraces both operating cost and first cost. In purchase price, economy arises from intelligent manufacture, based on large buying power and low overhead. In operation, it implies honest performance, carefree service, low weight and long life. Economy, dependability, convenience and smoothness are the four cardinal points of practical aircraft power. All result from the same basic fundamental of construction— precision. Continental Aircraft Engines are economical to buy, own and operate, because they are Precision Built. Continental is producing Practical Aircraft Power.

"Approved Type Certificate No. 32, U. S. Department of Commerce"

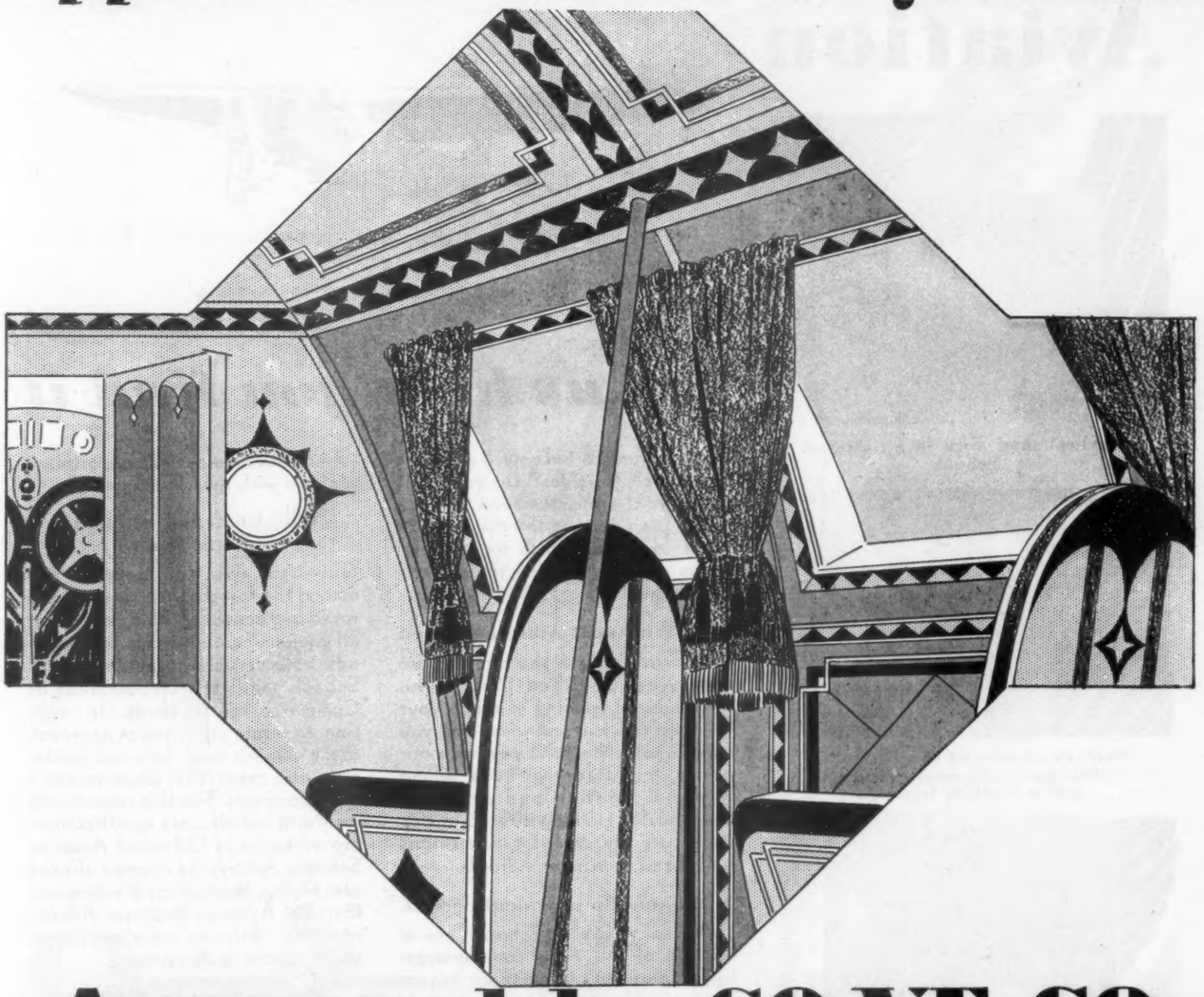
CONTINENTAL AIRCRAFT ENGINE CO.

General Office and Factory: Detroit, Michigan

Continental Engines

Drawing upon the facilities and experience of the greatest engine builder in the world, Continental is uniquely enabled to counsel with the trade in the design and production of engines to fit individual requirements.

Appearance? A Sales Question



Answered by CO-VE-CO

WHEN rich, luxurious, durable, ageless interiors are desired, whether it be a yacht, your country home or a fine airplane, *select Co-Ve-Co paneling.*

Co-Ve-Co Port Orford Cedar is extremely light in weight and evenly grained. One of it's outstanding qualities is the ease with which it can be worked, requiring comparatively little sanding, if any, to bring it to a suitable finish. It does not splinter or pit while being put through a planer.

If the wood is to be stained the effect is free from the artificial appearance of other stained woods. The colors seem to be of the very fibre of the wood itself. Various shades of light brown used so often in early American homes can be duplicated perfectly without effort on the part of the painter. The result is a soft glowing quality at once attractive and appealing to anyone interested in purchasing an airplane.

Co-Ve-Co Port Orford Cedar is economical to buy, economical to use. As an aircraft manufacturer or aircraft engineer you should have samples of Co-Ve-Co Port Orford Cedar and Co-Ve-Co Sitka Spruce plywood. It is not too late to incorporate Co-Ve-Co in your 1930 production plans. *Write or wire!*

PORT ORFORD CEDAR PRODUCTS COMPANY
Marshfield, Oregon

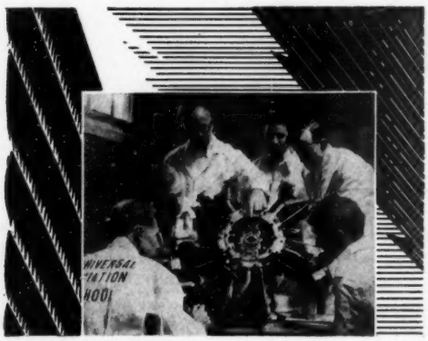
Southern California
CALIF. PANEL & VENEER CO.
955 S. Alameda Street
Los Angeles

Exclusive Sales Representatives
DANT & RUSSELL, INC.
Portland, Oregon

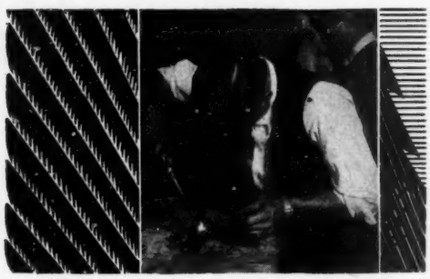
Northern California
H. B. MARIS PANEL CO.
735 Third Street
San Francisco

TRAVEL BY AIR... FLY YOUR MAIL AND EXPRESS

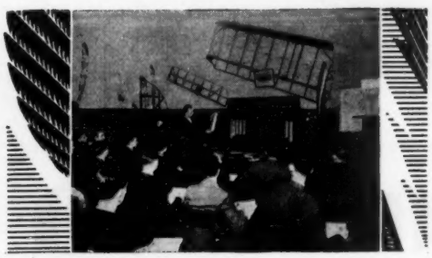
There is a job for you in Aviation



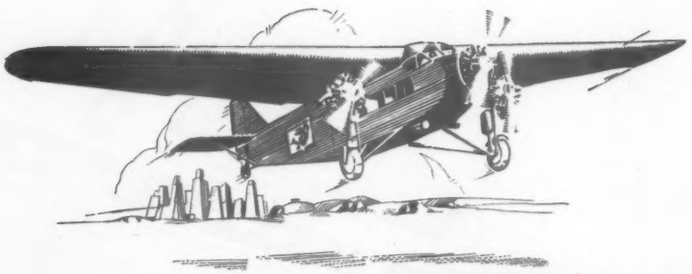
Practical shop work in a Universal School.



Many graduates of the Universal welding course are employed at good pay in airplane factories.



A typical class room in one of the schools of this national system.



At least 10 hours training in *tri-motor* planes is a part of the regular transport pilot's course.

Let us help you find it

Do you want to become a pilot? A mechanic? A welder? Do you want to enter the business end of aviation? Then send in the coupon with the information which we ask and let us advise you how to realize your ambitions.

How We Assist Ambitious Men

When you return the coupon, we study your qualifications. If you need special training to reach your goal, we tell you just what kind you should have. We send you, with our advice, an attractive book telling all about aviation and describing the kinds of training offered in this *national system of government approved aviation schools.*

A National Employment Service

Universal Aviation Schools are a division of the American Airways, Inc., the world's largest air transportation system. This system is constantly opening new routes and employing additional men. Universal graduates are given first consideration whenever new men are employed. And other large air transportation systems, airplane manufacturers and aviation supply houses, knowing the high type of training offered in Universal Aviation Schools, turn to our employment department for men with aviation training.

Why Universal Students Rank High

Universal Aviation Schools are among the few that are government rated and approved. This means that all equipment, instructors and methods of instruction in Universal Schools meet the Department of Commerce requirements. In addition, to retain government approval, these schools must turn out graduates who meet the department's high standards. For this reason only men with satisfactory qualifications are accepted in Universal Aviation Schools. Among the courses offered are: Flying, Mechanics, Welding and General Aviation Business Administration. Also an excellent home study course in Aviation.

How to Start in Aviation

Mail the coupon giving full details on all questions asked. We will tell in reply what training you need and send you the book, "Aviation—What It Means to You." This book gives qualifications required of students, cost of training and all information you should have. If you want a place in aviation, fill in the coupon and mail.

INFORMATION BLANK
Fill in and mail

UNIVERSAL AVIATION SCHOOLS,
1052-61 Boatmen's Bank Bldg., St. Louis, Mo.

Please advise me what training I should take.
I prefer position as Pilot_____,
Mechanic____, Welder____, Office Work____.
Name_____ Age____
Address_____
City_____ State_____
Telephone Number_____
My past experience is_____
_____
_____

C-4

Universal Aviation Schools

A DIVISION OF AMERICAN AIRWAYS, INC.
Operating Company of The Aviation Corporation
A National System of U. S. Government Approved Schools

Another Advance In Welding Blowpipe Design

WITH the introduction of the new Type W-17 Welding Blowpipe, Oxweld again raises the standards of blowpipe performance.

New principles are incorporated — valuable old principles refined. The result is an entirely new general utility oxy-acetylene welding blowpipe.

The W-17 is light in weight and perfectly balanced. It enables continuous welding without fatigue. It will not backfire. It provides intense heat over a greater area. The goose-neck head facilitates welding in difficult positions.

The W-17 incorporates, of course, the Oxweld low pressure injector principle—assuring maximum economy and efficiency.

Examine the new W-17 carefully at the first opportunity. Write today for detailed information.

OXWELD

WELDING AND CUTTING APPARATUS AND SUPPLIES

Reliable, Economical, Long Lived—
Typically Oxweld

OXWELD ACETYLENE COMPANY

Unit of Union Carbide UCC *and Carbon Corporation*

NEW YORK

SALES OFFICES IN PRINCIPAL CITIES
IN CANADA: DOMINION OXYGEN CO., LTD., TORONTO

PRECISION AIRCRAFT ENGINE PARTS

Ex-Cell-O Combines Precision Production With Dependability

In the effort to attain the highest possible degree of accuracy, Ex-Cell-O has not lost sight of the fact that strength and dependable hardness are quite as important in aircraft engine parts as the adherence to specified limits. Ex-Cell-O's heat-treating department employs the most modern of electrically controlled heat-treating equipment. ¶ Ex-Cell-O's plant facilities include external, internal, Blanchard, and surface grinding; thread milling; precision gear production, and screw machine production. All Ex-Cell-O parts are made to engine builder's specifications. Illustrated descriptive booklets will be mailed upon request.

1200 OAKMAN BLVD. :-: DETROIT

Ex-Cell-O also manufactures Ex-Cell-O drill jig bushings, the famous Ex-Cell-O internal grinding spindle, surface grinding spindles, and precision Diesel engine fuel pump parts. Catalog upon request.

EX-CELL-O
Aircraft XLO *& Tool*
Corporation

Here's the airplane you've been looking for!

WACO "Model F"
3-place open-cockpit biplane

Performance

Top Speed.....115 m.p.h.
Cruising Speed..... 95 m.p.h.
Landing Speed..... 32 m.p.h.
Rate of Climb.....1000 ft./min.

Specifications

Cockpits fully upholstered . . . molded Pyralin windshields . . . dual controls, including dual brake controls with locking feature . . . storage pockets in front cockpit . . . oleo shock struts . . . 26 x 5 non-skid tires . . . brakes . . . tail wheel.

Compass, tachometer, altimeter, oil pressure and temperature gauges . . . gasoline gauges . . . navigation lights . . . emergency kit . . . fire extinguisher.

Optional color combinations: vermillion, green or blue fuselage, with black-and-gold striping and silver wings.

Prices

With Kinner 100 h.p. engine $4100
With Warner Scarab engine . $4250
(Flyaway, WACO Field, Troy, Ohio)

WACO AIRPLANES

"Ask Any Pilot"

Gliding is great sport

. . . and WACO has built such a glider as you would expect of WACO. Priced at $385 complete ($295 knocked down). Write for details.

. . . It almost flies itself . . . It gives you low-cost air transportation . . . It can use small landing fields

THE new WACO "Model F" has been called "the easiest-flying ship in America." It reflects the seasoning of WACO design . . . combines in one airplane all those qualities that have made WACO successful. It has every desirable quality for commercial operation and student training, but beyond this is ideally suited to the non-professional flyer who may use it for business trips or simply for the joy of getting about through the air. It has satisfying speed and responsiveness without prohibitive operating costs, is ruggedly constructed and has the characteristic "WACO Safety Factor" —the ability to get in and out of the smallest fields. And all this at a first cost which sets a new standard of value in ships of its class.

Have a flight demonstration! Note how steady it is in flight, keeping to a straight course "hands off" almost indefinitely. Yet it is instantly responsive to the controls, at any speed and any angle of attack. Note how the nose can be pulled up to the stalling point without the controls "mushing" or the plane falling off.

See how slow it comes in to a landing . . . 32 miles per hour . . . slower than you generally drive your automobile. It has no tendency to "float" and its effective dual-controlled brakes will bring it up to a dead stop in less than 125 feet. You can prove that if you care to.

Gas consumption is 12 miles or more per gallon at cruising speed, with 400 mile cruising range. Depreciation and upkeep, also, are less in most cases than for a high-grade automobile. Owner records of hundreds of previous WACOs prove it!

Demand for the "Model F" indicates that it will exceed in popularity all its famous predecessors. The waiting list for deliveries is increasing daily. We suggest that you see your nearest WACO dealer without delay . . . and will direct you to him if you wish.

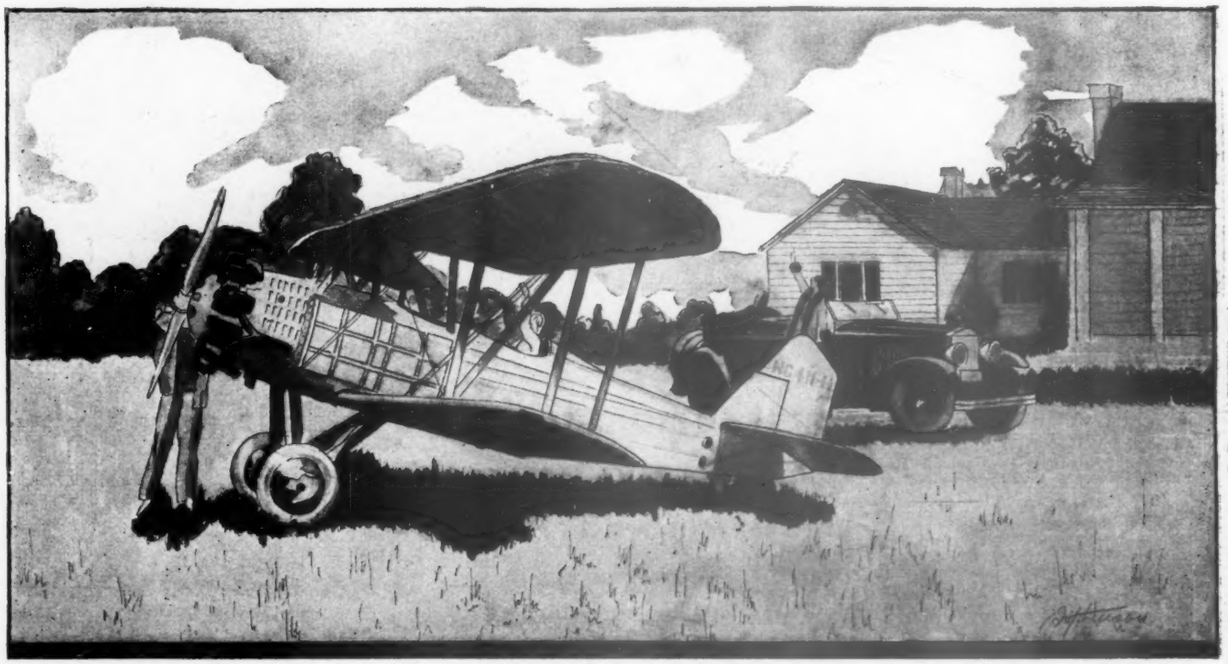
THE WACO AIRCRAFT COMPANY, Troy, Ohio.

0-11

There are more WACOs in commercial service than any other American make

Corsair...

the ideal two place ship for BUSINESS OR SPORT



FROM your first glimpse of the *Corsair* . . . on the ground or in the air . . . you find yourself admiring the ship tremendously. Fly it and the *Corsair's* superb handling and masterly performance will emphatically confirm your first impressions.

The quality characteristics of the *Corsair* make it the ship you need for private use—either business or sport. Exceptional speed range, maneuverability and climb—the ability to get into and out of the smallest fields, and at high altitudes, too—plenty of reserve power in its "Wasp" engine—sturdiness of construction and reliability of operation—all are inherent in the *Corsair*.

These qualities have been amply proven by millions of air miles with the Navy and Marine Corps—in Mexico, South America and the Orient.

The *Corsair* is available for land or water use—by the simple interchange of landing gear. Equipment and appointments will be provided to meet your specific needs. CHANCE VOUGHT CORPORATION, Hartford, Connecticut. Division of United Aircraft & Transport Corporation.

CHANCE VOUGHT CORPORATION

Insist On

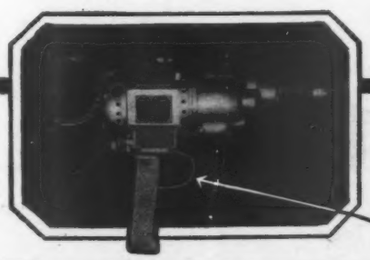
BLACK & DECKER
Wire Wheel Brushes

LOOK FOR THE FAMILIAR RED AND BLACK LABEL

BLACK & DECKER WIRE WHEEL BRUSHES are longer lived and more effective because of the quality and density of the tufts. These thick tufts of high carbon steel wire are woven correctly into a finished product which has no equal as a brush for cleaning metal parts.

Bristles do not mat down, nor break off easily—lessening the hazard of injury to operators when buffing.

Standard sizes from 4″ to 12″ diameter. Equip your bench grinder or ¼″ Heavy Duty Drill with wire wheel brushes for cleaning valves and motor parts.



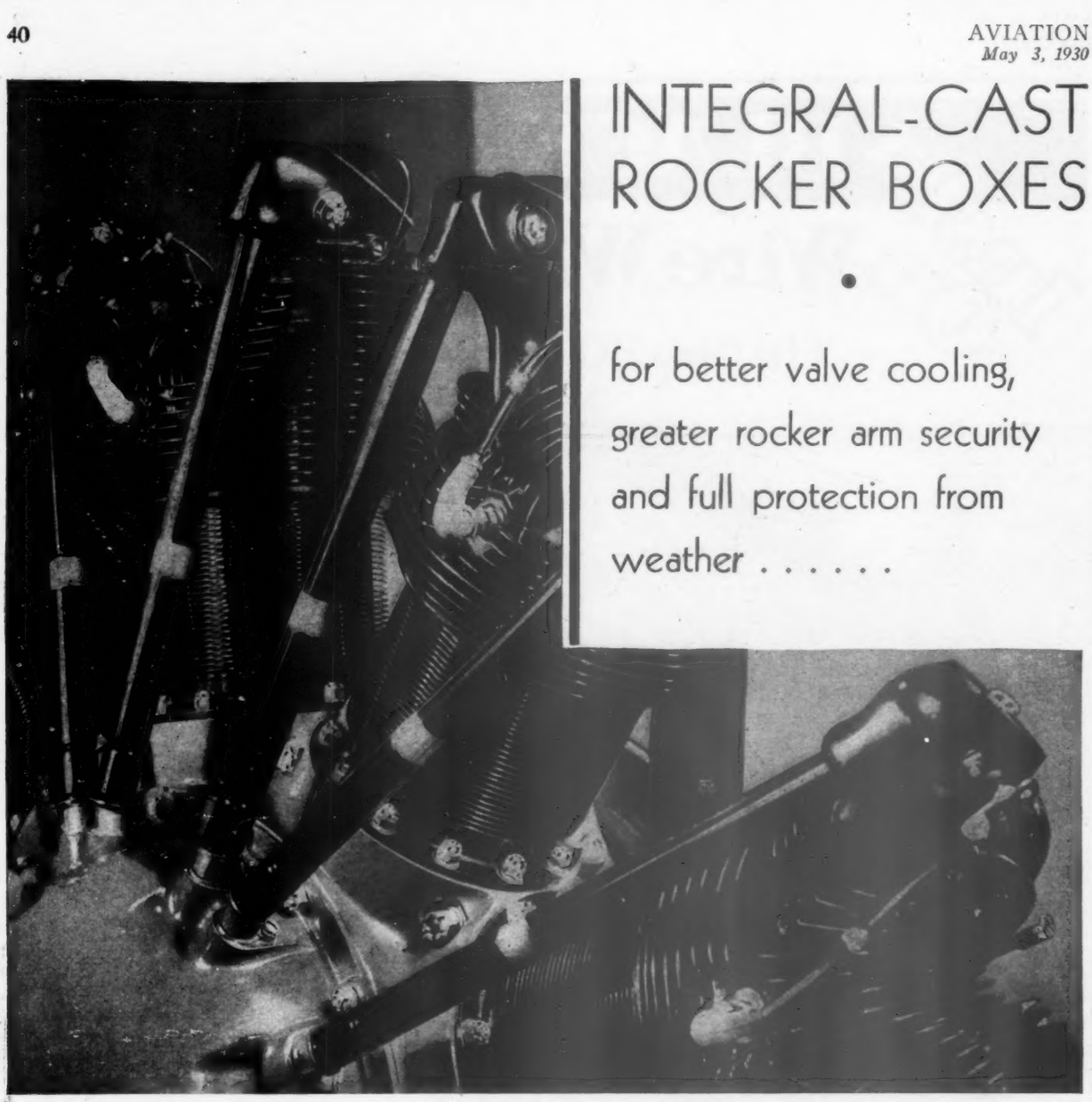
The BLACK & DECKER MFG. CO.

TOWSON, MD.

Slough, Bucks., England — Toronto, Ontario, Canada

Sydney, Australia

"With the Pistol Grip and Trigger Switch"



INTEGRAL-CAST ROCKER BOXES

•

for better valve cooling, greater rocker arm security and full protection from weather . . . . . .

The integral casting of rocker boxes costs money and requires more time in foundry, in machine shop and in assembly. Yet it is a feature which you naturally expect to find in Pratt & Whitney engines. Its use provides better valve cooling and insures greater security for the rocker arm and valve springs. In addition integral casting protects these essential parts from the weather by making it possible completely to enclose the valve gear, guarding against snow, sleet and rain.

This construction is only one of dozens of Pratt & Whitney features which contribute that dependability for which the famous "Wasp" and "Hornet" engines are universally known.

THE PRATT & WHITNEY AIRCRAFT CO
HARTFORD - - CONNECTICUT
Division of United Aircraft & Transport Corporation

Wasp & Hornet *Engines*

Manufactured in Canada by Canadian Pratt & Whitney Aircraft Co., Ltd., Longueuil, P. Q.; in Continental Europe by Bavarian Motor Works, Munich; in Japan by Nakajima Aircraft Works, Tokio.

CLIMATE

The Priceless Contribution of Los Angeles County to the Aircraft Industry

The logical concentration of the aircraft industry in Los Angeles County has developed here an available supply of skilled mechanics, trained pilots and aviation experts unsurpassed in any other American community.

Upwards of 2500 students are constantly in training in 25, or more, aviation schools.

There are 55 airports and landing fields.

18 air-transport lines, including 4 trans-continentals, have their termination here.

Climate is the one factor most vital to the economical operation of the aircraft industry. It is an asset or a liability according to where you locate your plant.

In Los Angeles County, as in no other section of America, the elements favor aeronautics; no extremes of heat or cold... more hours of sunshine... less wind... practically no electrical storms greater visibility... less hazard in the air.

Smaller plant investment suffices here. Labor conditions are ideal. Human efficiency is high. Living conditions are easy. These advantages, peculiar to Southern California, are definitely reflected in the balance sheets of air craft manufacturers in Los Angeles County.

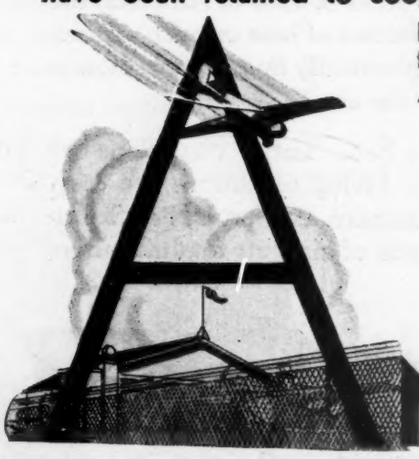
Air-Minded LOS ANGELES *County*

Facts and figures to support the above statements will be furnished upon request. Address: Industrial Department, Los Angeles Chamber of Commerce.

WINGS FOR THE ANCHOR POST FENCE COMPANY

THE shattering of a bottle--a few dedicatory words, and the Anchor Post Fence Company Plane taxied to the runway to make its initial flight, inaugurating the establishment of the Anchor Airport Sales Division.

The ever-increasing demand for Anchor Fence Protection from the Aviation Industry has made possible this new service. Capable and experienced "airport-trained" men have been retained to cooperate with Airport Managers in solving their fencing problems. This service is at your command. Just write or telephone the nearest Anchor Sales Office and the Anchor Plane will be directed to your landing field.



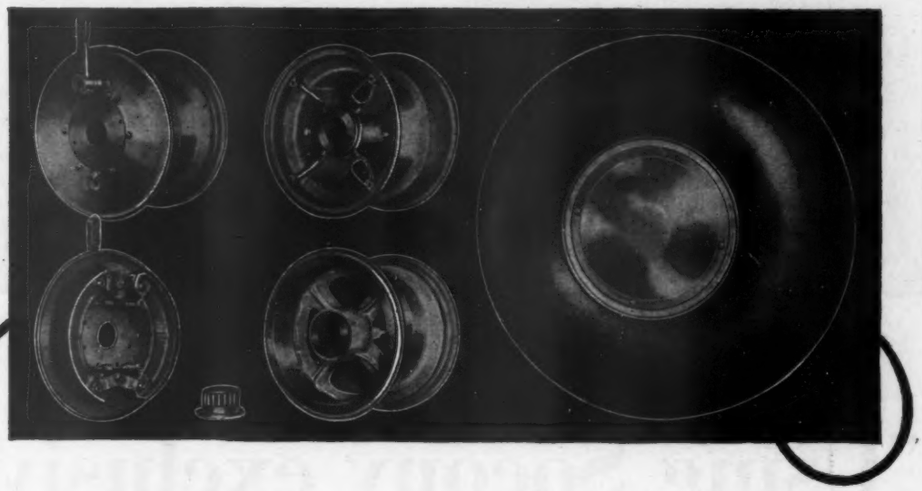
ANCHOR POST FENCE COMPANY
Eastern Avenue and Kane Street
Baltimore, Maryland

Albany Boston Buffalo Charlotte Chicago Cleveland Detroit Hartford
Houston Los Angeles Mineola, L. I. New York Philadelphia Pittsburgh
St. Louis San Francisco Shreveport, La.

Representatives in all principal cities. Consult your local classified directory.

ANCHOR FENCES

Constant Development Insures Our Continued Leadership

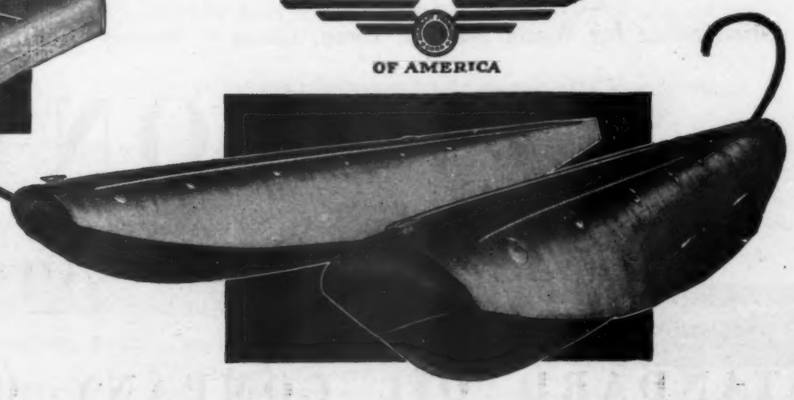


Designers and manufacturers of Airplane Wheels and Brakes, Axles and Complete Undercarriages, Oildraulic Shock Struts, Tail Wheel Assemblies, Pontoons, Flying Boat Hulls, Wing Tip Floats, Airplane Skids, Gasoline Tanks, Oil Tanks and Oil Coolers.

AS America's leading producers of aircraft parts, our policy is one of constant development and improvement. Our engineering staff, composed of national authorities in their respective fields, is responsible for the broad acceptance of our products throughout the industry. Units designed and manufactured by the Aircraft Products Corporation are used in the construction of airplanes produced by 72 American manufacturers. Our manufacturing facilities, geared for mass production on aircraft parts exclusively, and our low selling expense due to the volume of our business and a wide diversity of products, establishes the Aircraft Products Corporation as your logical source of supply. We invite you to participate in the economies of this mass production.

AIRCRAFT PRODUCTS CORPORATION OF AMERICA
DETROIT, MICHIGAN

Aircraft Products
CORPORATION
OF AMERICA



Students and planes of the Charles Dallas, Inc., Flying Club at the Buffalo Airport. This club is the largest east of the Mississippi.

"Using Socony exclusively

. . . *ample proof of my appreciation*"

"It is particularly gratifying to note the excellent results in all the different types of motors I have used, regardless of weather conditions.

"The fact that I am using Socony Aviation Gasoline and Socony Aircraft Oils exclusively is ample proof of my appreciation of your products."

* * *

So writes Mr. Charles Dallas of Buffalo, distributor for Waco, Stinson, Ryan, Great Lakes, and Monoaircraft aeroplanes. The Charles Dallas Flying Club is the largest east of the Mississippi, operating six ships now, and ten ships are to be in commission by June 1st.

Only gasoline and oils of such a standard as to be completely reliable are suited to aviation purposes. It is the consensus of opinion in airports and throughout aviation circles that Socony products are of this high standard.

SOCONY

Aviation Gasoline Aircraft Oils

STANDARD OIL COMPANY OF NEW YORK

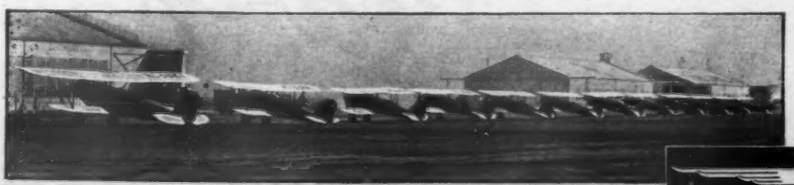
FOR
EVERY
FLYING
REASON

They're choosing

STEARMAN

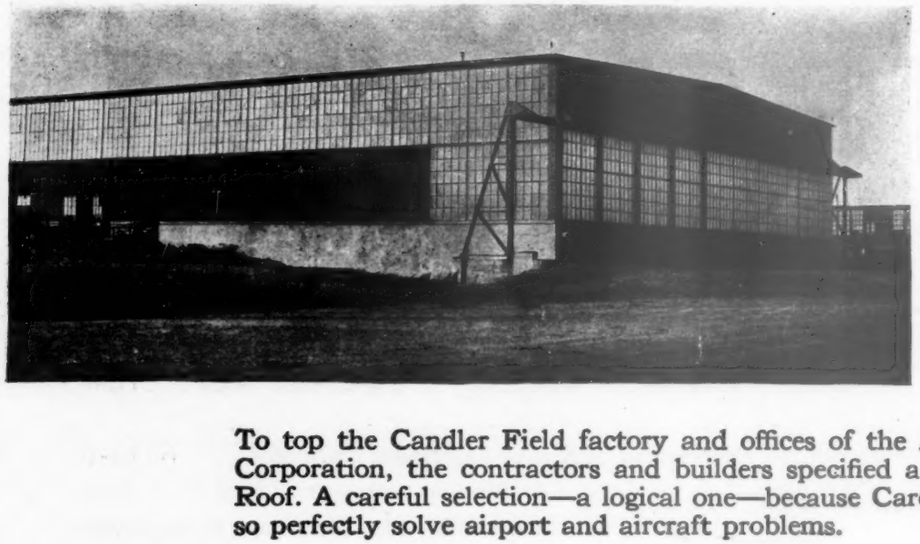
Nothing else quite "fit." . . . That's why in one single California County, Alameda, a Broker . . . Student . . . Rancher . . . Instructor . . . Ice Cream Man . . . Paint Salesman and four Prominent Sportsmen . . . all bear witness to the adaptability of a Stearman to the diversified activities of modern transportation. . . . Stearman . . . Business Speedster 225 H.P. . . . Junior Speedmail 300 H.P. and 400 H.P. . . . ships built to tolerances the man at the stick would specify. Write. Wire. Phone.

STEARMAN AIRCRAFT COMPANY, WICHITA, KANSAS,
Division of United Aircraft and Transport Corporation.



Bought in one county, flown in many. A dozen Stearmans of Alameda County, California

These Atlanta aircraft properties [*at the famous Candler Field*] are covered with Carey Built-up Roofing



Factory and offices of the Atlanta Aircraft Corporation, Candler Field, Atlanta, Ga., are protected by Carey Built-up Roofing —applied on a half-inch layer of Masonite insulation over a truscon steel deck. The Flagler Company, Contractors and Builders, Atlanta.

To top the Candler Field factory and offices of the Atlanta Aircraft Corporation, the contractors and builders specified a Carey Built-up Roof. A careful selection—a logical one—because Carey Specifications so perfectly solve airport and aircraft problems.

Super-durable, super-visible— the Carey "Aeronautic" Roof . . .

This rough-and-tough-textured Carey Built-up Roof was selected, first of all, for its unusual air visibility. Then, too, it is weather-tight, durable, with exceptional elasticity and tensile toughness. Laminated, built up layer upon layer, sealed and resealed again and again. Fulfilling all the exacting requirements of arched roof construction—the Carey *Aeronautic* Roof! May we tell you, in detail, about Carey Roofing Specifications for Aviation Buildings?

THE PHILIP CAREY COMPANY / *Lockland,* CINCINNATI, OHIO

Philip Carey Products

For Aviation Field Service:

Carey Corrugated Asbestos Roofing and Siding—for hangars, motor test sheds, laboratories, etc. Carey Elastite Asphalt Plank—for flooring runways, taxi strips and hangars. Carey Elastite Expansion Joint—for protecting concrete work against expansion and contraction strains. Carey Heat Insulations—for motor test sheds, aviation power plants, etc.

THE AVIAN

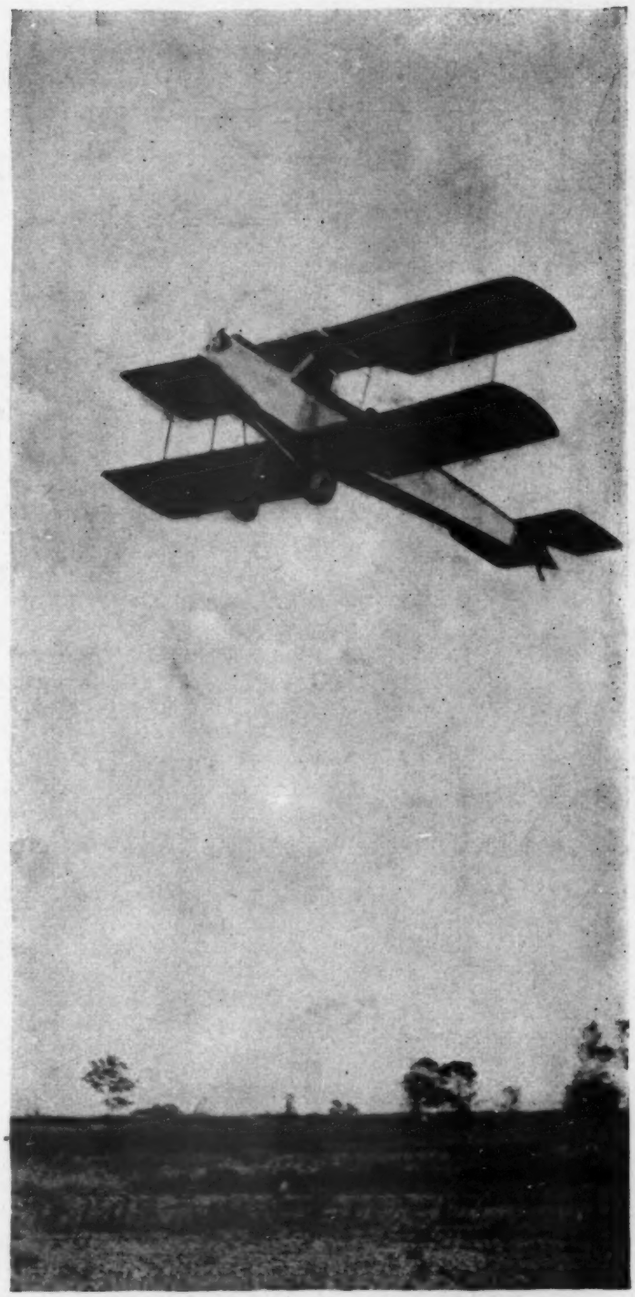
—for stability in the air - - - - - - -

"Flying performance that no other light plane can approach," pilots in 16 countries say of the Avian. Throughout a flight, this plane insures absolute safety. Its structure is many times stronger than the strains of normal flight regime.

Added to the Avian's inherent stability and airworthiness is the safety assured in the Handley-Page wing slots. These slots eliminate danger of spins, improve lateral control and lower landing speed.

No other light plane can equal the Avian for safe performance. It is the ideal plane for sport, business or training. Its flying qualities speed up the solo flight. Finally, the Avian is economical to operate—every gallon of gas gives 20 miles of travel.

Notice the new low price and time payment plan—send for details.



IN AMERICA
WHITTELSEY AVIAN
AVRO AVIAN
IN ENGLAND

TO DEALERS AND DISTRIBUTORS

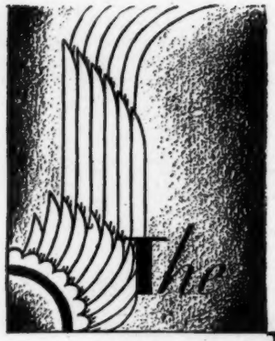
When you fly or sell the Whittelsey Avian you have something to talk about. No other light plane has such a record of performance . . . or the equipment. Dealers and distributors are still being appointed Write for our sales plan, and for full data and specifications of the plane itself. The Whittelsey Manufacturing Company, 225 Howard Avenue, Bridgeport, Conn.

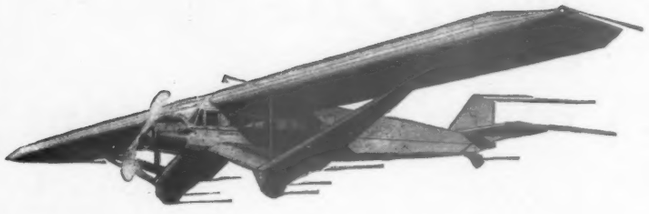
WHITTELSEY AVIAN

THE OUTSTANDING SPORT AND TRAINING PLANE OF THE WORLD

THE COST OF IT : : : : :

Whittelsey Avian	$3845
Down Payment	$1358
Balance monthly payments	
Handley-Page Wing Slots (extra)	$450





BELLANCA AIRBUS

. . . a new 12 to 14 place airplane built for *profit-per-passenger* operation

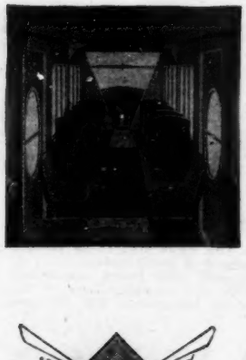
A PROMINENT aeronautical writer recently published the following statement in the New York *Times:* "Several conservative operators, and many pilots, either never have dropped their belief in or are now adopting the doctrine of single-motored planes as against multimotored, for both efficiency and safety."

Never before has discussion so openly inquired into ways and means of cutting operating costs. On every hand, operators are seeking measures of economy which, at the same time, will maintain or increase efficiency and safety. Alive to the needs of the day, Bellanca announces production of the new AIRBUS as an answer to this problem.

For economy, the AIRBUS will save nearly 40% of the current operating costs per passenger mile as compared with trimotored craft of similar capacity.

For efficiency, the AIRBUS merits the reputation won by its predecessors in every national efficiency contest entered since 1922, and in the commercial service rendered by Bellanca Aircraft over some of the world's most important and arduous routes.

For safety, the builders of the AIRBUS promise the same degree of self-flying stability —the same uncompromising standards of structural strength—as have been proved in the many Bellanca planes which, since 1908, have earned a perfect safety score. Above all, the AIRBUS is a plane which passengers will like! Its large, comfortable cabin carries 12 passengers and one pilot, or 11 passengers and two pilots, with ample space for baggage. Because of the unusual reserve performance, the AIRBUS will carry this large and profitable payload with utmost ease, on either wheel gear or floats, or—with a special combination of both—as an amphibian.



Here is a summary of data:

DIMENSIONS	
Span	65 ft.
Length	41 ft. 3 in.
Height	12 ft. 1½ in.

USEFUL LOAD	
Gasoline, 200 gal.	1,200 lbs.
Oil, 15 gal.	120 lbs.
Pilot	170 lbs.
Payload, 12 passengers and baggage	2,610 lbs.
Total useful load	4,100 lbs.

POWER PLANT

Interchangeable engine mounting to accommodate the Pratt & Whitney Hornet, the Wright Cyclone, or the Curtiss Conqueror, all geared down 2:1, developing approximately 600 h.p. at 2,000 r.p.m.

PERFORMANCE
(*Landplane*)

Full speed	145 m.p.h.
Cruising speed	120 m.p.h.
Climb	1,000 ft. per min.
Range, at cruising speed	765 miles

Now in active production, we are ready to quote delivery dates for this plane to interested operators.

BELLANCA AIRCRAFT CORPORATION
NEW CASTLE, DELAWARE

BELLANCA

Why bother with deaf-and-dumb signs?

SAYS an instructor to his student—"Now remember, when I put out the right hand, I want right rudder. The left hand—left rudder. Savvy?" . . . . .

But why go to the trouble—when it's so much easier, so much pleasanter, and so much *clearer*—to use Communicating Helmets!

Let the engine roar, let the wires whistle, you have only to *whisper* through these finely-functioning Spalding Sets—and the student, or passenger, will hear you perfectly. And there won't be any misunderstandings.

Made of velvety-soft brown capeskin—lined with chamois—with Spalding patented ear puffs and metal attachments, and detachable metal tubes . . . Spalding Helmet Sets can be used with the communicating tubes, or without.

Spalding single helmets with communicating tubes—$13.50. And if it's all right with you to have the student talk back—get a *double* set, at $25.00.

Spalding has a complete stock of flying equipment. It is carried by all Spalding stores, and at many of the leading fields. Or let us send you the free catalog.

CLIP FOR FREE AVIATION CATALOG!

A. G. SPALDING & BROS., A. 5-30
105 Nassau Street, New York City
Please send free Aviation Catalog

Name_____

Street_____

City_____ State_____

A. G. Spalding & Bros.

AVIATION EQUIPMENT

© 1930, A.G.S. & B.

PACKARD-DIESEL AIRCRAFT ENGINE

Detroit to Miami at a fuel cost of less than one cent per mile!

IN a Packard-Diesel equipped plane, Captain L. M. Woolson, chief aeronautical engineer of the Packard Motor Car Company and Walter Lees, test pilot, recently flew from Detroit to Miami, Florida, on *$8.50 worth of ordinary furnace oil.*

The airline distance between the two cities is approximately 1200 miles—which means that the fuel cost averaged less than one cent per mile! Nonstop, the trip was made in 10 hours and 15 minutes.

This flight strikingly demonstrated the economy and reliability of the Packard-Diesel Aircraft Engine. Tested by the Army and approved by the Department of Commerce, it has introduced to Aviation a revolutionary new powerplant.

The Packard-Diesel Aircraft Engine, A. T. C. No. 43, develops 225 H. P. at 1950 revolutions per minute and weighs only 2.26 pounds per horsepower. It starts easily, responds to the throttle instantly, and operates smoothly at all speeds.

Several manufacturers are already offering planes equipped with the Packard-Diesel Aircraft Engine.

Captain L. M. Woolson (left), chief aeronautical engineer of the Packard Motor Car Company and Walter Lees, test pilot, with the Packard-Diesel equipped plane in which they made the epochal flight from Detroit to Miami.

Now in quantity production, the Packard-Diesel is available to all commercial aircraft manufacturers.

PACKARD MOTOR CAR COMPANY, *Master Motor Builders*
DETROIT, MICHIGAN

PROTECTION

CHIN'S Great Wall of China furnishes one of the most out-

standing examples of protection.

Manufacturers interested in protecting their products against rust and corrosion should investigate the universally adopted Udylite process.

Over six hundred concerns representing practically every industry are now doing Udylite plating in their own plants.

Why not request full information now?

UDYLITE is the electrolytic application of pure cadmium to base metals for protection against rust

Udylite
RUST PROOFS
REG. U.S. PAT. OFF.

UDYLITE PROCESS COMPANY

Sales Office:	3220 Bellevue Ave.	Sales Office:
30 East 42nd St.	DETROIT	114 Sansome St.
New York	MICH.	San Francisco

UPC

FORD PLANE PRICES REDUCED . . . .

EFFECTIVE IMMEDIATELY!

Now, at a time when the aviation industry needs the encouragement of every economy in operation costs, radical reduction in price of all three models of the Ford tri-motored, all-metal transport plane has been made.

The savings on the new price scale amount to as much as $5000 cut from the price of the 5-AT model, powered by three Pratt & Whitney Wasp engines, to carry fourteen passengers.

NOTE THESE REDUCTIONS IN PRICE

Model	*Previous Price*	*New Price*
5-AT (3 P & W Wasp engines)	$55,000	$50,000
4-AT (3 Wright J-6 engines)	42,000	40,000
9-A (3 Wasp Junior engines)	42,000	40,000
11-A (3 Packard Diesel engines)	42,000	40,000
7-AT (1 Wasp engine, 2 Wasp Junior engines)	51,000	47,000

The most modern scientific principles are being constantly applied to bring these great machines as near mechanical perfection as possible. THE EXTRAORDINARY RECORD OF FORD TRI-MOTORED, ALL-METAL PLANES IN OPERATION ALL OVER THE WORLD FOR MILITARY, SCIENTIFIC, AND COMMERCIAL TRANSPORT DUTY THOROUGHLY SUBSTANTIATES THE GREAT CONFIDENCE THE FLYING PUBLIC FEELS IN THEM.

FORD MOTOR COMPANY

Visitors are always welcome at the Ford Airport at Detroit

THE FORD PLANE

The Ford plane is planned, constructed and operated as a commercial transport. Built of corrugated aluminum alloys, it has great structural strength and durability, and is most economical to maintain in operation. The uniformity of its material is determined by scientific test. All planes have three motors in order to insure reserve power to meet and overcome all emergencies. The engines may be Wright, Pratt & Whitney or Packard Diesel, totaling from 675 to 1275 horse-power. Ford planes have a cruising range of from 580 to 650 miles at speeds between 55 and 135 miles per hour. Loads may be carried weighing from 3630 to 6000 pounds.

The capacity of these planes is 9 to 15 passengers and a crew of two (pilot and assistant). Planes can be equipped with a buffet, toilet, running water, electric lights, adjustable chairs.

The price of the Ford tri-motored, all-metal plane is exceptionally low because of its highly scientific methods of commercial production. Price is $40,000 to $50,000 at Dearborn.

Consult Ford branches for information on the Ford tri-motored, all-metal plane in all models.

FOKKER
PRICES REDUCED
$4,000 *to* $13,000

CERTAIN economies have resulted from the affiliation of Fokker and General Motors. Due to production and purchasing principles, based on many years of successful experience in manufacturing, costs have been sharply reduced. Quality of material and thoroughness of construction have, of course, been maintained at the high standard the industry expects from Fokker. These economies are now manifested in the following reductions which are effective immediately:

	OLD PRICE	REDUCTION	NEW PRICE
Standard Universal—Seven places . .	$15,000	$ 4,000	$ 11,000
Super-Universal—Seven places	$21,800	$ 4,300	$ 17,500
F 14 A Mail Plane—Nine places . . .	$26,500	$ 4,000	$ 22,500
F 11 A Flying Boat—Eight places . .	$40,000	$ 7,500	$ 32,500
F 11 A Amphibion—Eight places . .	$42,000	$ 8,225	$ 33,775
F 10 A Trimotor—Fourteen places .	$67,500	$13,000	$ 54,500
F 32 Four Motors—Thirty-two places	$— — —	$— — —	$110,000

Prices Flyaway Factory

FOKKER
AIRCRAFT CORPORATION
AFFILIATED WITH GENERAL MOTORS
General Motors Building, New York City

When a Salesman Travels By Air

THE head of Miller and Company smiled broadly and beckoned Carter to his desk. For a reputably hard-boiled, hard-headed business man he seemed surprisingly affable as he shook hands with the young salesman.

"Glad to see you, Carter. We just closed a big contract that means doubling the order for steel which I gave you last week. I wired you to come because I didn't want to trust the details to a letter. But how on earth did you get here so quickly?"

"That's just it," Carter replied. "I didn't do it on earth—came over in my new Travel Air biplane. When I got your wire I hopped over to see if we couldn't get everything straightened up today so as to get the work started.

"How did I come to buy a plane? Well, I am out for my firm's bonus to the man with the biggest six months' sales. As my customers are scattered about the country I bought the Travel Air to bring 'em within easy reach. It's a great ship to get you around—comfortable, safe, and easy to fly. Then, the 225 h.p. Wright Whirlwind gives her a cruising speed of 104 miles per hour. After we straighten out this order, Mr. Miller, won't you come out and let me show you how nicely she flies?"

Needless to say Bill Carter flew away with the big prize. And so impressed with his enterprise and success were the directors of his firm, that they decided to investigate the application of a plane to their business. Their study soon revealed that tremendous savings in time and money could be effected with a plane, and resulted in the early purchase of another Travel Air—this time a six-place monoplane, ideally suited to the needs of business officials.

Executives who desire information about the use of the airplane in business will be interested to know how Travel Airs are profitably serving many industries. For full details address Dept. T-73

Sales Division
CURTISS-WRIGHT
CORPORATION
27 West 57th Street · New York

The Travel Air biplane carries three. Powered with 225 h. p. Wright Whirlwind, it cruises at 104 m. p. h., has a range of 550 miles

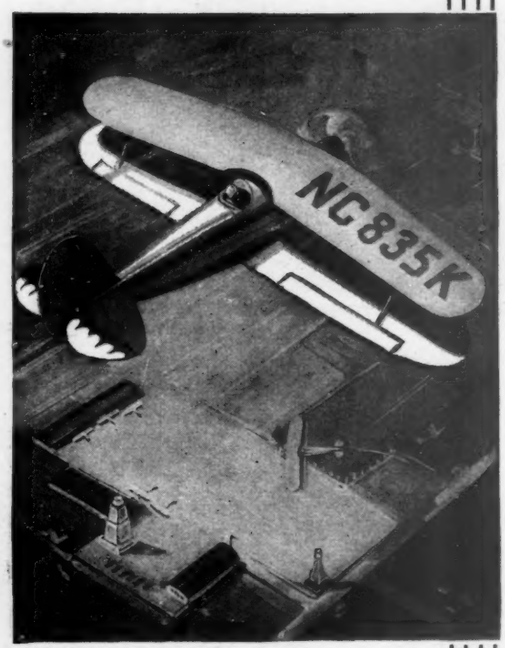
A PLANE FOR EVERY PURPOSE

TRAVEL AIR

The Travel Air monoplane carries six. Powered with 300 h. p. Wright Whirlwind, it cruises at 110 m. p. h., has a range of 430 miles

Latest Upholstery Fabrics
for
Modern Transportation
WM. WIESE & CO., INC.
234 WEST 56TH STREET
New York
WIESE
CABIN
INTERIORS

New Great Lakes OPERATING DEALER PLAN *means greater* PROFITS



Improved Great Lakes Trainer
New low price **$3150**

HERE'S a square-shooting franchise that gives the alert Operating-Dealer a chance to show a worth-while profit at the end of every year! Here's a franchise written for the dealer . . . backed by support that really means something!

• The new, improved 1930 model Great Lakes Trainer is the ideal flying school ship; suitable for both advanced and elementary training. It's economical to buy, economical to operate. It's neat and trim . . . handles to suit a king's taste! At $3150 (flyaway, Cleveland) the Great Lakes Trainer has an instant appeal to the graduate student buyer . . . almost sells itself. And even at this low price, there's an ample margin of profit for you. National advertising helps build good will for the Great Lakes Trainer; performance of the ship itself builds ready sales.

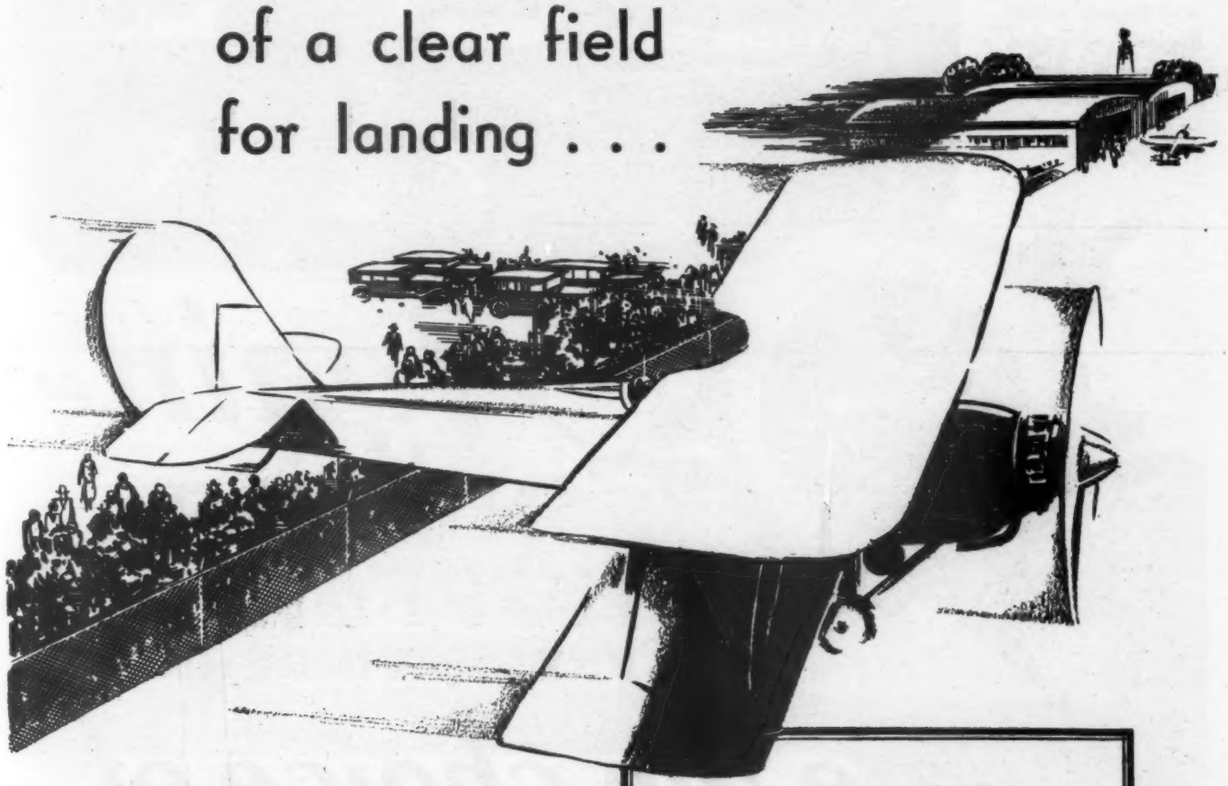
• Cash in on this great opportunity. Get into the money-making end of flying. We'll tell you how to go about it; how to get your school on a paying basis; how to interest capital in your enterprise; how to maintain a profitable service hangar. Write us a letter, telling all about yourself, your experience, your plans and the flying situation in your community. Address Great Lakes Aircraft Corporation, 16465 St. Clair Ave., Cleveland, Ohio.

Manufactured under U. S. Department of Commerce Approved Type Certificate Number 228

GREAT LAKES AIRCRAFT
CORPORATION CLEVELAND
Contractors to the United States Army and Navy

CONFIDENT . . .

of a clear field for landing . . .



PITTSBURGH CHAIN-LINK FENCE is ideally suited to airport enclosures. It affords no toe-hold for climbing, is sturdily built to resist the pressure of crowds, and will perform its job under the most severe tests. Pittsburgh Chain-Link Fence is good-looking, and offers an unobstructed view for legitimate on-lookers.

Made of the finest special formula, basic open hearth copper bearing steel, and hot zinc-coated after weaving with a smooth, extra-heavy and well-bonded coating of pure zinc, Pittsburgh Chain-Link Fence is designed to retain its shape and appearance and weather the years with a minimum of maintenance.

Make your airport safe for visiting pilots and it will become a popular port of call.

When crowds are held in control by proper fencing of the airport, pilots can approach the field with complete confidence that it will be clear

Erection service is available any place. Write for specifications and descriptive literature.

Pittsburgh Steel Co.

Union Trust Bldg. Pittsburgh, Pa.

New York Chicago Memphis Detroit San Francisco Dallas

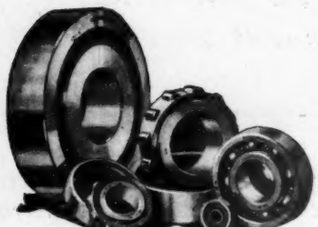
Pittsburgh Fence

CHAIN-LINK TYPE

3013

The "Comet" Aircraft Engine—Comet Engine Corporation, Madison, Wisconsin manufacturers.

Again~ NORMA-HOFFMANN PRECISION BEARINGS ~~~ are the choice of AVIATION ENGINEERS!



Our engineers are ready to work with you—with many years of experience in aircraft applications as a basis of their counsel.

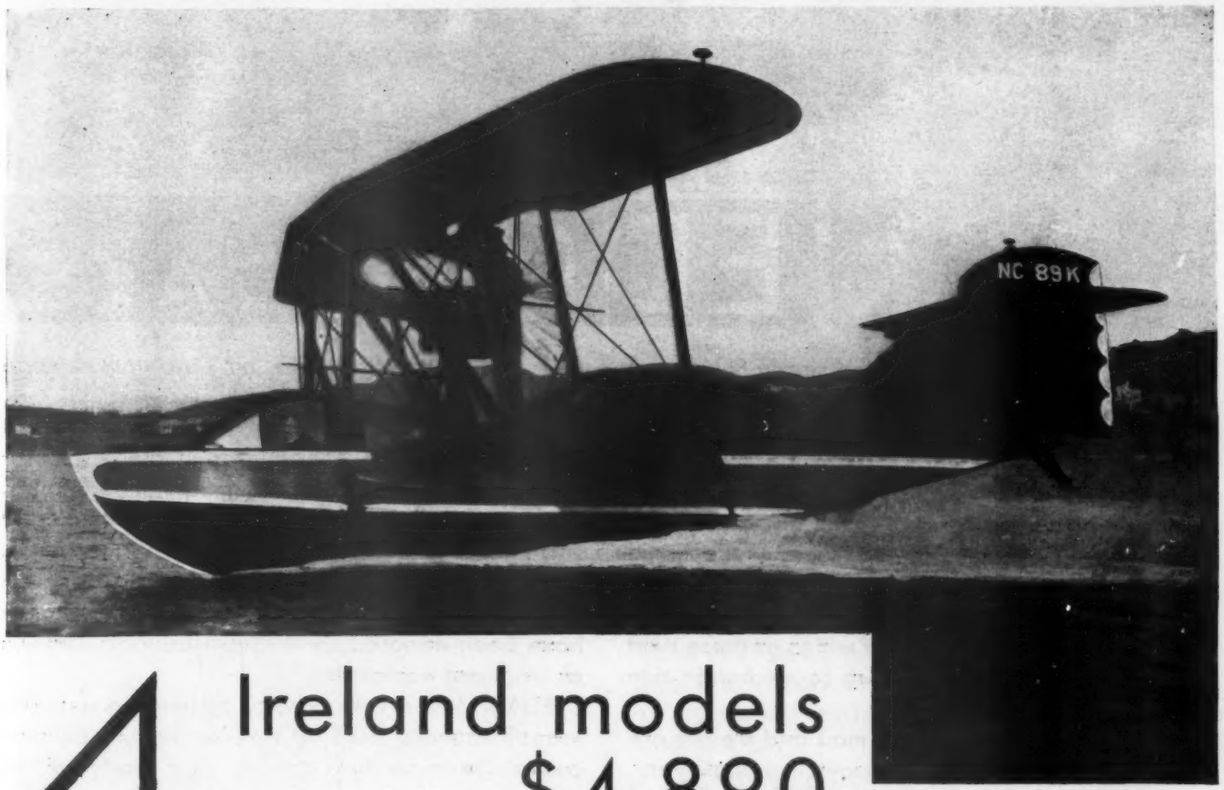
IN THE new "Comet" Aircraft Engine, the crankshaft load is carried on two NORMA-HOFFMANN Precision Roller Bearings. The super-dependability for which PRECISION stands in the aviation world, commanded the confidence of these designing engineers—and that confidence is being justified by the performance of the "Comet"-powered passenger and express planes operating on daily schedules.

N-1046

NORMA-HOFFMANN BEARINGS CORPORATION STAMFORD, CONN., U.S.A.

THIS IS AN AMPHIBION YEAR!

NO LIMIT NOW
to Amphibion Sales!



4 Ireland models . . . $4,890 to $23,000

Until this year, sales of amphibions were restricted to the wealthy . . . those who could, and would, pay $18,000 and up.

But now Ireland sweeps away the cost-hurdle . . . brings amphibion ownership within the reach of thousands instead of hundreds . . . with the first complete, well-balanced line . . . the first price-range that covers the entire gamut of purchasing power!

You dealers have never before faced such possibilities of profit as now exist in the 1930 Ireland line . . . two new ships . . . Privateer Model 1, a 2-place flying boat at only $4,890 . . . Privateer Model 2, a 2-place Amphibion at $5,550; the lowest-priced Amphibion ever produced . . . a new 4-place cabin Amphibion at $18,000 . . . and the famous 5-place Amphibion de Luxe at the new reduced price, $23,000.

This is more than merely an amphibion year . . . 1930 is IRELAND'S year! Ireland dealers are receiving cooperation that is putting them, and the Ireland line, in a dominating position.

Established aircraft dealers of substantial financial standing are invited to request information covering the Ireland dealer policy, which assures mutual satisfaction and profit. Ireland Aircraft, Inc., Garden City, Long Island, New York.

A Model for Every Air-Minded Purse

Privateer, Model 1: 2-place Flying Boat $4,890

Privateer, Model 2: 2-place Amphibion $5,550

4-place Cabin Amphibion $18,000

5-place Ireland Amphibion de Luxe $23,000

IRELAND AMPHIBIONS

ONE OF THE BUSY BASES OF WESTERN CANADA AIRWAYS AT GOLD PINES ONT

WINGS OF EMPIRE TAKE TO THE AIR

EDO FLOATS

EQUIPPED with EDO Floats, the sturdy Fokkers of Western Canada Airways are spanning the vast empire of the North, bringing within a few days' flight communities whose isolation was once measured in weeks of toilsome journey by canoe. The Athabasca and MacKenzie Rivers—Great Bear Lake—Hudson's Bay—borders of the Arctic Ocean where the musher and his husky dogs were the sole messengers of commerce—now echo with the hum of motors and rush of wings as these swift carriers of the air hover down to exchange one burden for another.

Over half of Canada's air mail and freight are flown by Western Canada Airways. In a single year, they transported more than a million pounds of freight, nearly a quarter-million pounds of air mail, and 9,647 passengers. Machinery, supplies, and all the vital burdens of expanding commercial and industrial intercourse are flown northward. The treasures of miner and trapper are brought back. Aerial mapping and photography, timber surveying, forest and fisheries patroling, prospecting and exploring, are only a part of the task assumed by these ships that cruise the air and walk strange waters on EDO Floats.

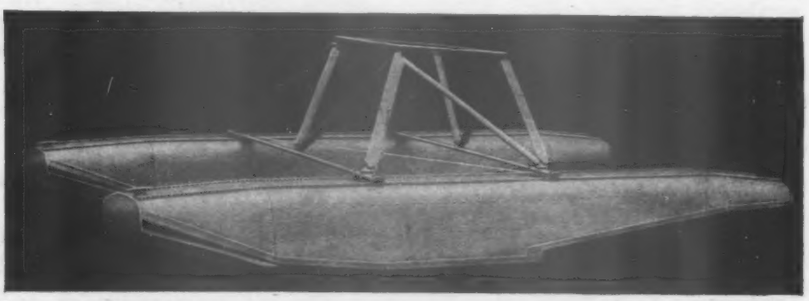
277,000 miles—3,400 hours of service—not without reason are EDO Floats in the service of this world's largest user of commercial seaplanes. W. L. Brintnell, Operations Manager, says: "After such exhaustive tests as all this flying entailed, EDO Floats have proved themselves to be much superior to those formerly used, and for this reason have been adopted by Western Canada Airways as standard equipment."

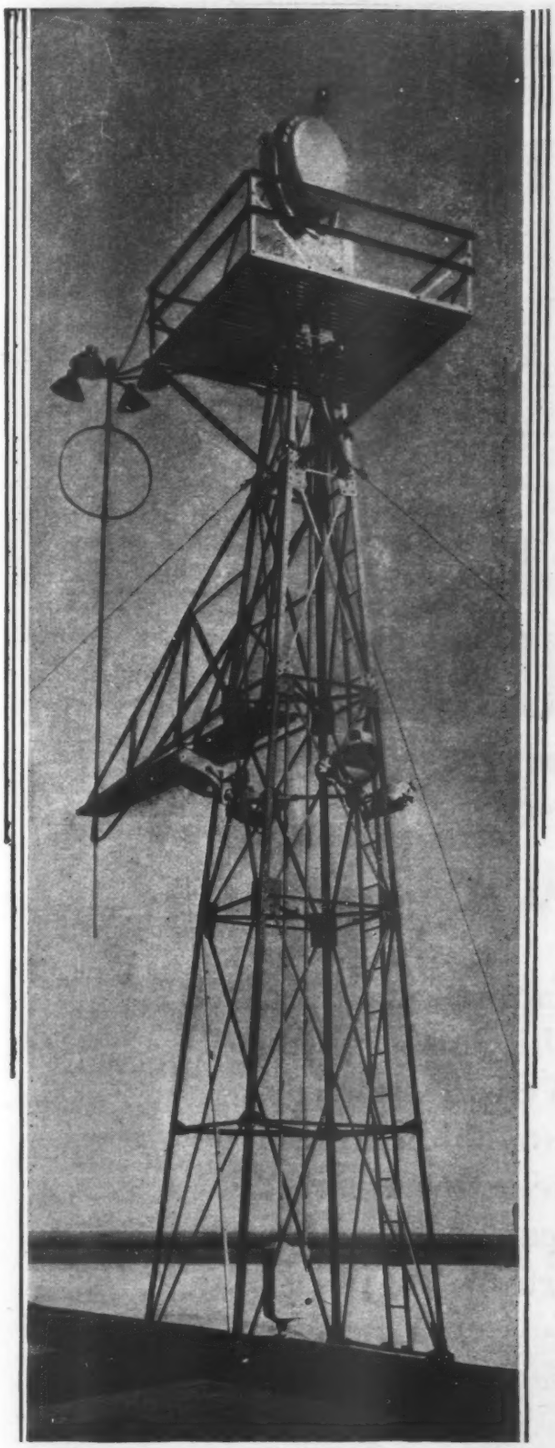
EDO Floats are the choice of leading airplane manufacturers, air line operators and private owners because they get big pay loads off the water in a hurry, are practical to operate, give long and dependable service. They are in use on over 40 distinct types of airplanes.

EDO Floats are designed and manufactured by engineers, whose experience dates back to the early days of seaplane float construction. The service of these specialists will be gladly given to manufacturers, air line operators and private individuals who have not yet availed themselves of it. For full information and cooperation, address Edo Aircraft Corporation, 600 Second Street, College Point, L. I.

FEATURES TO REMEMBER ABOUT EDO FLOATS

All metal construction.
Protected from corrosion.
Will not swell, shrink or absorb water.
Bulkheaded each 2 feet for protection.
Patented fluted bottoms for quick takeoff.
Heavy keels, shallow sterns for beaching.
Flat decks for ease of taking on loads.
Interchangeable with wheel landing gear.
Easy to install and overhaul.





BEACONS!

Type DCB-24

The airway beacons with their shafts of light piercing the darkness at regular intervals are an indispensable aid to night flying. It is with the aid of these beacons that pilots are able to bring their ships in to port safely and on schedule. These beacons therefore must be dependable in operation under any and all weather conditions.

The Crouse-Hinds Company manufactures a very rugged and dependable revolving beacon which meets the Department of Commerce specifications for use on airways.

Type DCB-24 revolving beacon shown above is constructed of cast silicon-aluminum alloy, and is dust-tight and weatherproof. A lamp changer can be provided for. The beacon can also be furnished with zenith lights.

Information upon request

CROUSE-HINDS

ESTABLISHED 1897

SYRACUSE, N. Y., U. S. A.

SALES OFFICES

NEW YORK
BOSTON
DETROIT
PHILADELPHIA
ATLANTA
MILWAUKEE
CHICAGO
ST LOUIS
CLEVELAND
CINCINNATI
MINNEAPOLIS
PITTSBURGH
LOS ANGELES
SAN FRANCISCO
DALLAS
SEATTLE

C-H 519

THE STRENGTH OF THE PLANE IS IN THE TUBING

Booth 120
at the
New York Aircraft Salon
will show how
TUBING by SUMMERILL

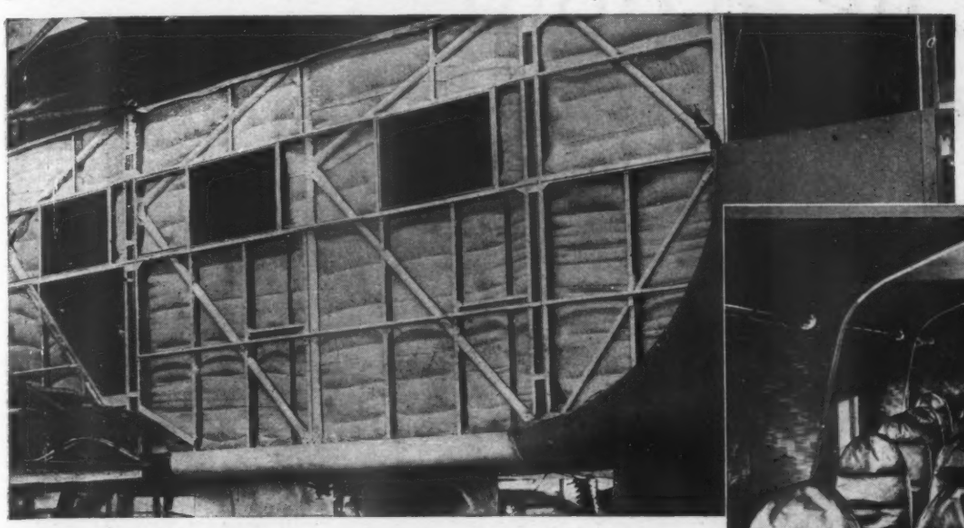
is drawn

Engineers and Manufacturers will be interested in seeing this model draw bench in operation. We will show you why the finish of Summerill Seamless Steel Tubes readily meet the Aircraft specifications by the care with which they are drawn

Manufacturers of Seamless Steel Tubing Since 1899

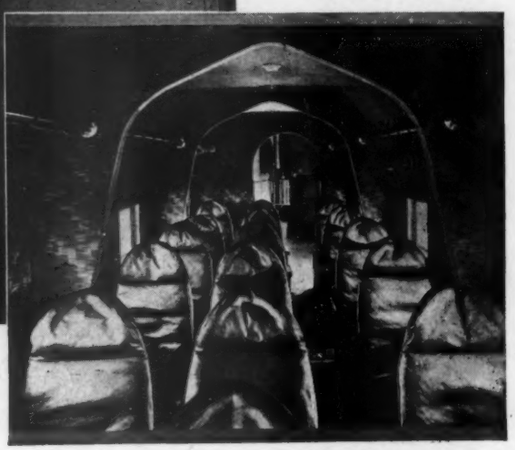
Summerill Tubing Company
Bridgeport (Phila. Dist.) Pa.

HERE IS MAXIMUM SOUND INSULATION WITH MINIMUM WEIGHT



At left — J-M Cabin Insulation applied to the Curtiss "Condor" Plane.

Below — Interior of Curtiss "Condor" transportation plane showing how any desired decorative effect can be applied over J-M Cabin Insulation.



the final touch of air travel comfort—

QUIET for the cabin plane passenger

TODAY, the air passenger can relax at ease amid the luxurious appointments of the modern cabin plane and can talk to his neighbor in ordinary conversational tones. Excessive noise—that last disturbing reminder that he is no longer on the ground has been removed from his mind.

J-M Cabin Insulation for soundproofing airplanes has helped to hasten this desirable change. Airplane cabins, J-M Insulated, are *really* quiet. Noise is no more disturbing here than in a railroad car in motion.

J-M Cabin Insulation now extends to air travellers the atmosphere of quiet comfort that the public has come to expect of transportation in general.

To provide the ultimate in cabin insulation, Johns-Manville uses Dry-Zero Airplane Blanket, the lightest commercial insulant known, weighing less than two ounces per board foot. It is easily and quickly applied. It is resistant to fire and permanent. It is an excellent heat insulation. It does not absorb moisture, which would increase its weight. With the least possible sacrifice of pay load, this J-M Insulation provides relief from noise, makes restful travel and uninterrupted sleep possible and permits an even temperature—neither too hot nor too cold—to be maintained in plane cabins.

Let us send you a sample section of J-M Dry-Zero Cabin Insulation and complete information on the U. S. Government tests.

One man can lift with one hand a bale of Dry-Zero, sufficient to provide quiet comfort for the entire cabin of this Curtiss "Condor."

JM PRODUCTS **Johns-Manville**

SERVICE TO TRANSPORTATION

Brake Lining · Packing and Gaskets · Built-up Roofing · Transite Roofing and Siding · Transite Pipe

Address JOHNS-MANVILLE
At nearest office listed below
New York Chicago Cleveland San Francisco Montreal
(*Offices in all large cities*)

Please send me information on J-M Cabin Insulation and U. S. Bureau of Standards report

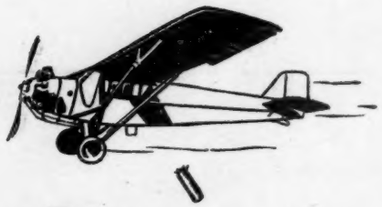
Name.....

TS-135-5

Address.....

The Robin

peddles the news while it is still news



Flashed from the four corners of the world . . . news comes in over the wires. Reporters on local assignments rush in their copy. Almost with the last click of the linotype machines the presses belch forth first editions. From start to finish, speed is the watchword of the modern newspaper—speed in gathering the news, writing it, printing and putting it into the hands of the reader.

Does H. D. Strunk, publisher of the McCook (Neb.) Daily Gazette, use rail or motor delivery? Not a bit of it. He uses modern transportation methods—a Curtiss Robin. He says "Our Robin is used to distribute newspapers to 40 towns. We fly 380 miles non-stop each afternoon, covering these towns in a little more than three hours and deliver more than 5,000 papers. Only once during the severe cold weather, which sometimes ranged down to 24 below zero, were we forced down—and then by a blizzard . . ."

The Robin is first choice of nationally-known business houses. A cabin monoplane of 3 or 4 passenger capacity, it cruises at 85 to 100 miles an hour. The Robin holds the world's record for endurance and is world-famed for its air-worthiness, durability, comfort and efficiency. The Robin equipped with brakes, and having an unusually low take-off and landing speed, can easily be handled on small, confined fields. Because of its unusual economy—its low initial, operating and upkeep cost—the Robin is a universal favorite among commercial operators. They endorse it as a real profit maker for taxi and charter, sightseeing and training service.

No less important to the airplane owner is the matter of service. Although the Robin seldom requires attention, forty Curtiss-Wright Flying Bases dot the country. No matter where you may be the services of Curtiss-Wright trained mechanicians are not far away. Complete information about the Robin, its specifications and performance data will be gladly sent you without cost or obligation. Simply address Dept. R-73, Curtiss-Robertson Airplane Mfg. Co., Division of CURTISS-WRIGHT, 27 West 57th St., New York.

How the Modern Newsboy Delivers the Papers

The newspaper consignment for each town is rolled on the half fold, tied with heavy cord and encased in a heavy sack. Each bundle of papers is stenciled with the name of the town. The bundles are piled like cordwood on the floor of the cabin. One seat has been removed from the cabin. In its position a ten inch hole has been cut for a home-made metal chute through which the papers are dropped at the various towns on the route. Small, cleared fields near the outskirts of towns are used. Their centers are marked by red flags. It is seldom the pilot misses this "spot" by more than fifty feet.

When it is not delivering papers, the "Newsboy" is used for speedy coverage of distant stories, for promotional activities, and some passenger business.

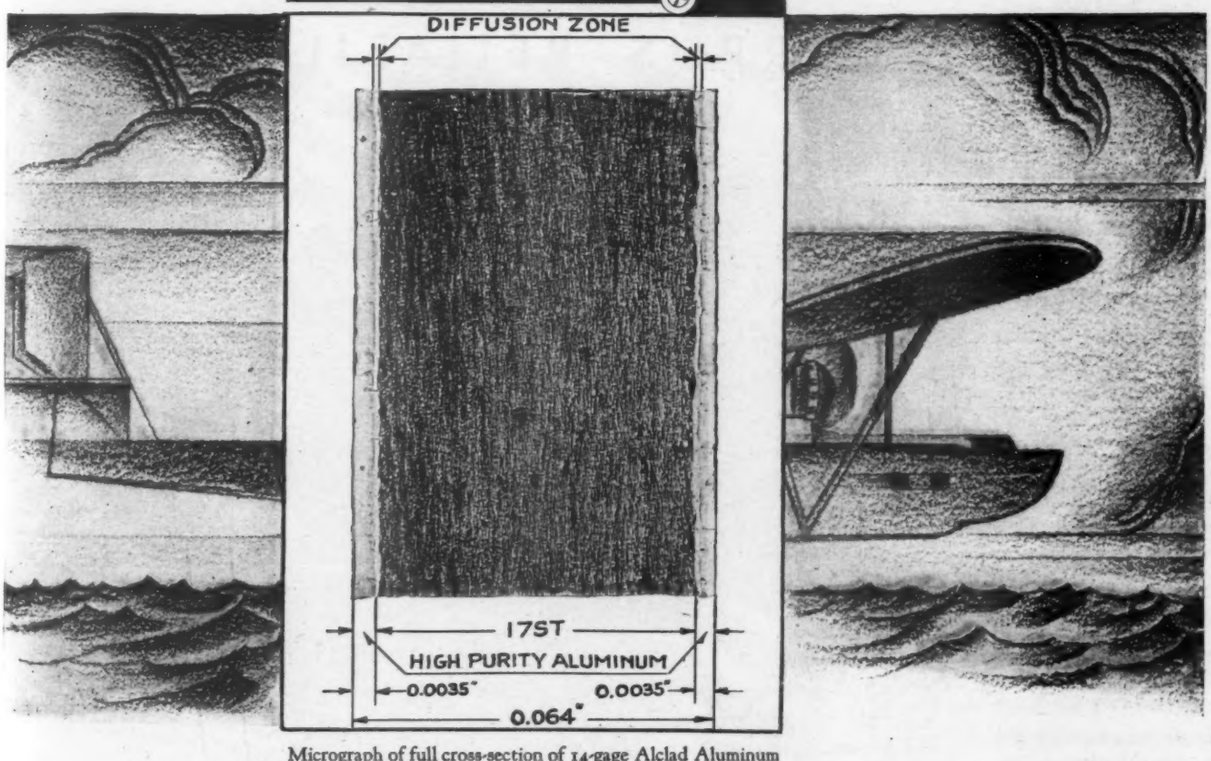
The Robin will be on display at the *New York Aircraft Salon*, Madison Square Garden—May 3rd to 11th

CURTISS ROBIN

For Business
Pleasure
Training

ALCOA ALUMINUM

THE ONE METAL THAT FLIES BEST



Micrograph of full cross-section of 14-gage Alclad Aluminum Sheet. Note the diffusion zone between the Alcoa Alloy core and the pure Alcoa Aluminum

Alclad Sheet combines light weight, strength and high corrosion resistance

A plane flies from Cleveland to Chicago. The sole source of revenue is its pay-load. Every pound of structural dead-weight shrinks that pay-load—eats up profits.

Airplane builders are seeking lighter materials for their planes. But other factors must be present in these materials. They must be strong. They must be resistant to corrosion.

Alclad Sheet is the modern material for airplanes in which all these factors are present. Alclad Sheet has an aluminum alloy core, coated with layers of pure Alcoa Aluminum. Thus Alclad has the strength of the light, strong Alloys of Alcoa Aluminum, and the corrosion resistance of pure aluminum.

Parts made of Alclad Sheet are, generally speaking, equal to steel in strength, but only half as heavy. Alclad Sheet is used successfully on seaplanes operating in the tropics—the most severe type of service from the standpoint of corrosion.

Alclad Sheet and all the light, strong Alloys of Alcoa Aluminum are fabricated with standard metal-working equipment. No special technique is required.

Our nearest office will gladly send a competent engineer to give you full information on the application of Alcoa Aluminum Alloys to aircraft. ALUMINUM COMPANY *of* AMERICA; 2482 Oliver Building, PITTSBURGH, PENNSYLVANIA.

ALCOA ALUMINUM

THE WORLD HAS WRITTEN THESE RECORDS OF CIRRUS RELIABILITY

1927 — Non-stop flight by Bert Hinckler — London to Riga (Latvia) — 1,200 miles in 10¾ hours — Cirrus powered plane.

1927 — Solo flight by Lieut. R. R. Bentley — London to Capetown, S.A.—8,000 miles — Cirrus powered plane.

1928 — Solo flight by Bert Hinckler — England to Australia—12,000 miles in 15½ days—Cirrus powered plane.

1928 — Solo flight by Lady Heath—Capetown to London —8,000 miles — Cirrus powered plane.

1928—Longest flight by light plane by Capt. W. N. Lancaster and Mrs. Keith Miller —England — Australia and Tasmania — 17,400 miles — Cirrus powered plane.

1928 — Cirrus powered planes won first in reliability, speed, economy, climb, aerobatics, controlability and maneuverability — Gothenburg International Flying Meet.

1928 — Solo tour of 8,000 miles by Miss Amelia Earhart — New York to Los Angeles and return—Cirrus powered plane.

1928—Light plane altitude established by Lady Heath who reached a height of 18,000 feet—Cirrus powered plane.

1929—Finish of Lady Bailey's 18,000 mile tour of Africa—most wonderful solo flight ever accomplished by a woman over uncharted routes. Cirrus powered plane.

1929 — Non-stop flight by Tex Rankin — Vancouver to Agua Caliente — Cirrus powered plane.

CIRRUS engines are flown in more countries than any other light aircraft engine. They have made light planes possible and private flying safe and practical. The outstanding records set forth on this page have established a confidence in Cirrus performance that promises fine competitive flying talent and universal interest in the forthcoming American Cirrus Flying Derby.

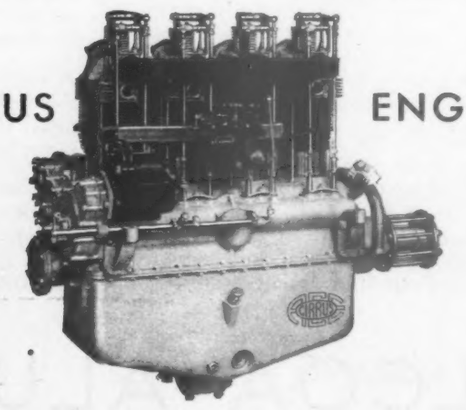
$25,000 ALL AMERICA FLYING DERBY

Sponsored by American Cirrus Engines, Inc., sanctioned by National Aeronautic Association. The world's greatest race over the air lanes of three nations. First prize $15,000; Second prize $7,000; Third prize $3,000. Open to all pilots flying ships equipped with American Cirrus Engines or American Ensign Hi-Drive Engines.

Write for entry blanks and full information.

AMERICAN CIRRUS ENGINES, INC., MARYSVILLE, MICHIGAN

CIRRUS ENGINES



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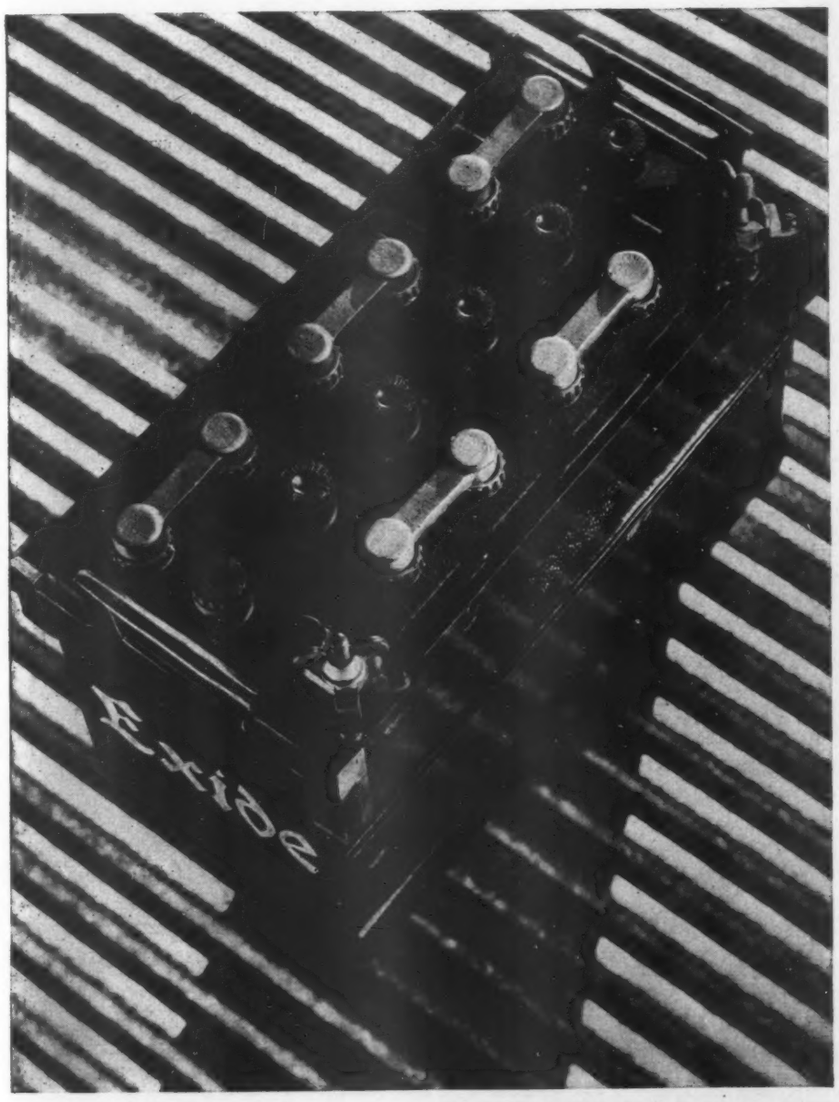

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AVIATION

THE OLDEST AMERICAN AERONAUTICAL MAGAZINE

A McGRAW-HILL PUBLICATION . . . ESTABLISHED 1916

EDWARD P. WARNER, *Editor*

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The Metropolitan Market

FOR THE THIRD TIME in three months the somewhat harassed and jaded aircraft industry is assembling for a show of virtually national significance. Admitting the burden that shows constitute, admitting the necessity of some reorganization that will reduce that burden and that will mark the distinction between the national and the local show more sharply than it has yet been drawn, still any serious attempt to sell airplanes by displaying them to the population of the area that centers around Manhattan island is of inevitable concern to every manufacturer of planes or of parts. The first show in ten years to be held in that area with the sanction of the Aeronautical Chamber of Commerce is bound to be an event of somewhat more than local interest.

To those who seek to keep a critical eye upon the aircraft industry as a whole and upon its business methods, the most interesting feature of the New York display is not going to be the technical detail of the equipment shown there, but rather the conduct and the apparent intentions of those who show it. The New York Show offers another opportunity of seeing how much the typical distributor, or for that matter the typical factory sales department, has really learned about showing his product to the public and about planning a specific selling method directed to a specific section of the market. In a show of which the major interest is technical, and where a large number of new designs of great importance are revealed for the first time, a certain slackness in selling methods and some disorganization of approach to the public is to be foreseen if not to be approved. At a show in which the participants are a mixed group of distributors and manufacturers, and which is held in a center of the aircraft industry and attended largely by those whose interest is more in production than in purchasing, some such confusion of selling purpose and paralysis of individual selling effort as was painfully manifest in some quarters at Detroit must be accepted as more or less natural, although by no means commendable from the point of view of the industry's finances. The New York Show will offer no such excuses to the dilatory. It will put upon the exhibitors, and especially in those cases in which the exhibit is in sole charge of the local distributor, a problem of dealing with a very specialized, in fact a unique, market.

As an outlet for luxury products in the United States, New York takes first rank. Even now, in spite of the amazing growth in population and wealth during the past few years of Los Angeles, Detroit, Cleveland, and various other cities, the market which has its root in the financial operations of lower Manhattan remains pre-eminent in average unit capacity for articles of high price. Of foreign automobiles and of custom built bodies New York gets far more than its share. Of "commuting" motor boats at from $15,000 to $100,000 apiece, likewise. In buying aircraft the Gotham area has been relatively laggard, partly because of the lack of airports, but with steady improvement being made upon that point the opportunity exists for a greatly increased consumption of airplanes. The buying power is there. There are many hundreds of thousands of sales, perhaps more than in any other part of the United States, that have not yet been made, but of which the non-completion has been entirely free from any influence of the monetary factor. There will be a great many people in the neigh-

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borhood of Madison Square Garden next week who could buy an airplane without a moment's hesitation or concern over its price or its operating cost. A considerable number of them will get inside the Garden and look around. If they leave without at least a tentative decision to buy an airplane it will be because they, average citizens of average conservatism, have not been persuaded that they can use one with reasonable convenience, pleasure, regularity, and safety, and thereby save a substantial amount of time or trouble in their personal affairs or in the conduct of their business. There is the test for the industry.

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Lionel M. Woolson

AGAIN we make a sorrowful pause to pay tribute at the grave of a great leader of the aircraft industry. An evil fate takes Captain Woolson from among his friends, co-workers, and amicable rivals at a moment that would have been a fitting climax for any career. Just four weeks ago we were privileged to reveal the details of the engine upon which he had labored for three years. In general outline and in detail it bore his stamp, and its victories were his personal triumphs. It is no discredit to other exhibitors, or to other contributors of engineering papers, to say that Captain Woolson's engine was the dominant feature of the Detroit Show and that his paper describing it in detail and recounting the episodes of its development was the high light of the Detroit meeting of the Society of Automotive Engineers. He has a permanent place in aeronautical history as the man who took the compression-ignition engine for aeronautical purposes out of the realm of conversation and put it to test in the air. His name will gain added luster in proportion as that type of engine gains added strength in the aeronautical world.

There have been many men who have accomplished one notable feat, and those who knew them best were least able to understand how they had done it. Among those who knew Captain Woolson, and who had known his earlier work, no such question and no suspicion of a lucky freak ever arose. He approximated to the ideal engineer. He combined imagination, profound theoretical knowledge, practical skill and recognition of practical limitations, caution and reserve in promises of accomplishment, and an ever-warm enthusiasm. Given the desire to promote the development of any engineering novelty, no better man could have been found to undertake the work.

All that is significant enough in its way, but it is personality rather than attainment that is the subject of sincere mourning. To Lionel Woolson's friends his eminence as an engineer was incidental. He was a true gentleman, in the best and rarest sense of that much-abused term. Charm, modesty, and generosity would have marked him, and did, in any society.

"Death, e'er a vandal indiscriminate,
Shattering the living fabrics which enshrine
The noblest intellects, insatiate,
Lays in low ruin Heaven's best design."

//

Personal Liberty and Flying

ANY private individual can drink any thing, at any time, and to any extent that he pleases—within the limits of his friends' endurance—without our using editorial space to comment upon his personal taste, so long as he remains a private citizen, without effect on the progress of aviation. *But*—however they may be voting with the *Literary Digest,* it is a safe bet that every man, woman, and child in this or any other country who contemplates a trip by air wants the pilots, mechanics, and officials of the transport line to be the soberest, most efficient, and most dependable body of men anywhere. Generally speaking, the passenger can feel confident that that very natural desire on his part is fulfilled. Taken as a whole, the men who run air transport set a very high standard.

However, those who come into indirect contact with aeronautical operations, as customers or as mere onlookers, are in no position to make a delicate distinction between the sheep and the goats, nor to realize the difference between the responsibilities that lie upon the operating personnel of an air line, on the one hand, and the salesmen for aircraft accessory companies on the other. To the great public, at least in the first stages of its contact with aviation and of its mildly developing interest in aeronautical affairs, "It's all aviation," and the industry's manners and morals are made the subject of categorical conclusions.

That makes the official fostering of organized drinking on the grand scale a much more serious matter than it would be if it affected only those engaged in it. It is too serious to be overlooked. Where it exists it is striking a savage blow at public confidence, which the aircraft industry needs more than anything else in the world. When companies attached to and allied with the aviation business and presumably doing all in their power for its advancement will go to considerable trouble and expense to provide the battlefield and the equipment, not merely for a little after-dinner conviviality but for a prolonged collective spree, it is time to call a halt. That any firm operating its own planes can sanction such excesses and still demand that its pilots remain sober at all times surpasses our understanding.

Now, more than at any other time to date, the aviation industry should be free from all taint of alcoholism.

Too many lurid rumors of plane crashes supposedly traceable to booze have gone afloat. If we are to hold public confidence and gain acceptance of all phases of flying we must institute and maintain standards of personal conduct of the most rigid sort. The railroads' rules for their operating personnel are inflexible and almost fanatical, and were so long before there was a prohibition law. Unpleasant though it is to try to regulate personal conduct, the air lines cannot afford to accept in any detail a lower standard for their personnel than that maintained by surface transport. A little of the sort of leadership given by the officials of the Aeronautics Branch of the Department of Commerce, ever since the time when Secretary MacCracken announced that there was a flat rule against drinking by field and technical personnel and that went for everybody, high and low, is always in order.

It may be unnecessary to raise this subject at all. We commented upon it editorially last summer, and at that time the situation seemed distinctly worse than it does now. Certainly, there has been less excessive and offensive drinking at the shows this winter and spring than at any previous exhibitions within the memory of the oldest inhabitant. Even if the industry and the operating personnel were unanimous in their good intentions, however, we should still feel called upon to protest against the illjudged generosity of numerous chambers of commerce and welcoming committees which, when their towns are visited by air tours or even by individual pilots, feel that the canons of hospitality and the supposed tastes and demands of aviators require that the manufacture and distribution of cocktails immediately be put on a mass production basis. However varied may be the sentiments of the individuals invited to partake; the aircraft industry as a whole ought to make its lack of sympathy with that type of entertainment as emphatic as possible.

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Creating a Market

EVENTS of the past six months have thoroughly demonstrated to the aeronautical industry that the broad popular market for aircraft does not yet exist. The market upon which manufacturing programs and sales organizations are now primarily based is the internal one, consisting of transport lines and miscellaneous air service organizations; a restricted field at best.

Air-consciousness has been over-rated as a sales factor. Popular enthusiasm for flying has often meant enthusiasm for flying by the other fellow. We have yet to sell most individuals upon the desirability of their taking to the air themselves as a matter of regular habit. A popular market must be literally created before we can hope to see anything like quantity production of aircraft.

Publicity, advertising, and sensational exploits by famous pilots have been used to the utmost to build up a highly colored picture of aviation's future. Such activities are merely preliminaries to actual demonstrations of the airplane's capabilities, and will have been utterly wasted unless individuals are given demonstration flights and are sold—one at a time—on the convenience and desirability of personal use and ownership of aircraft.

The airplane is widely known to everyone in the abstract. Its use is still an unknown quality and quantity with the bulk of the general public. Like any other new product, flying must be actually demonstrated before it will be accepted. The established way to gain acceptance for a product is to distribute samples, which speak for themselves concerning the merits of the product. Pencils, bread, shaving cream, razor blades are all popularized on this basis. A faithful attendant at public markets could live on free samples of food products. Everyone is familiar with the fact that he may have an automobile and driver at his disposal without definite obligation, at almost any time by telephoning almost any automobile dealer.

The automobile did not gain spontaneous acceptance when it was first introduced. Seriously restrictive laws were passed against its use in many localities, some of them being still very much in evidence. The automobile gained ground rapidly because it was constantly being demonstrated to all prospective purchasers. Not only were the dealers assiduous in the good work, but almost anyone could and did obtain free automobile rides regularly from proud neighbors who had preceded him in ownership.

Flying is no longer heroic. It is now as commonplace as the morning shave. Men who automatically became heroes by finding that they could fly have not always been so willing to accord the same honor to the rest of the general public. From the standpoint of the airplane manufacturer aiming at a popular market, the barnstormer and the "joy-hopper" have been selling something which should have been given away. If we ever hope to create a popular market for airplanes we must give the prospective purchaser liberal demonstrations free of charge. So long as folks pay cash simply for the adventure of getting into the air the airplane will rank among novelties, and there will be no "popular" airplane market. No one thinks of paying for a ride around a track in an automobile, yet once they did just that. On the other hand, legitimate uses for the aerial taxi or sightseeing plane should be expanded just as those for the automobile have been. No legitimate use of the airplane will be harmed by a liberal policy with regard to flight demonstrations to anyone who can by any stretch of the imagination be considered a prospective purchaser of an airplane. Aircraft factories, dealers, and distributors must maintain such a policy, which some of them have already adopted, if sales volume is to be satisfactorily increased.

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New York Shows

OF THE PAST

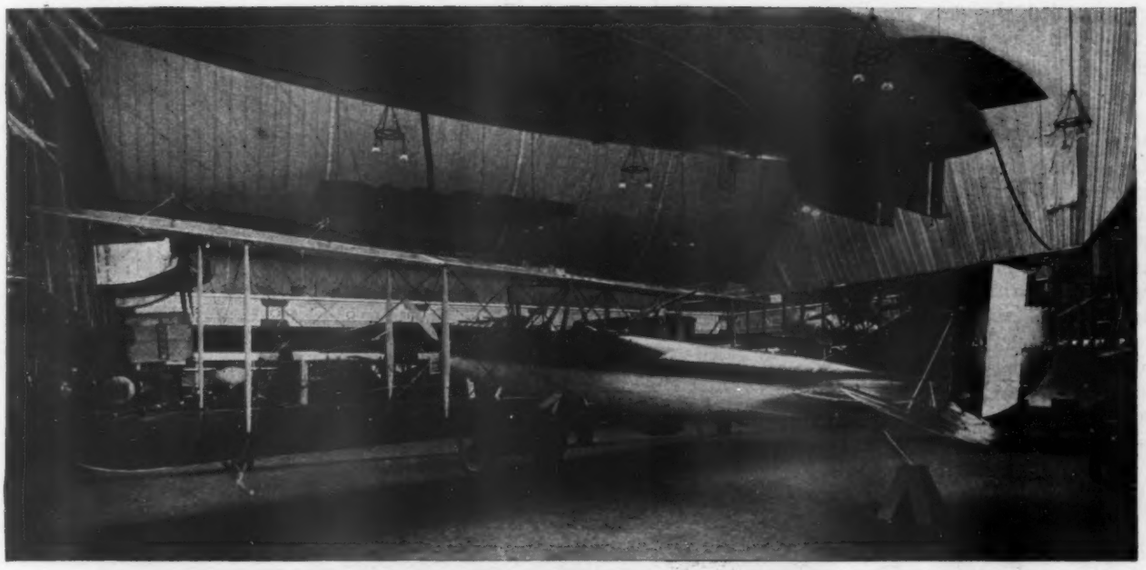
Six Exhibitions, From 1912 to 1930, Have Had Widely Varying Purposes and Results

By CHARLES E. NOYES
Assistant Editor of AVIATION

WITH the somewhat ambitious title of "First International Aeronautical Exhibition," an aviation show was held in the Grand Central Palace, New York City, May 9-18, 1912, under the auspices of the Aero Club of America. While it was frankly following the lead of the Paris expositions of 1908 and 1911, most of the exhibits were American. Altogether, about fifteen planes and as many engines were shown. Considerable public interest was evinced, and more than half of the 10,000 celebrities invited were present at the formal opening, which was presided over by Admiral Osterhaus. The daily attendance, however, was numbered in hundreds rather than thousands.

Since that time, only five aviation shows have been held in the world's largest city. While this has been due in part to the difficulty and expense of finding a suitable location, it must also be admitted that not all of the five have been completely successful. Immediately

A corner of the 1917 exposition at Grand Central Palace



Exhibits at the New York show in 1919 held at the 69th Regiment Armory

before and after America's participation in the War, interest in military aviation was sufficient to make possible two expositions which were quite popular. Feb. 8-15, 1917, were the dates of the Pan-American Aeronautic Exposition and Convention, which drew delegates from 25 countries, and a total attendance of about 75,000. March 1-15, 1919, the Manufacturers Aircraft Association held a First Annual Aeronautical Exposition, reported to have attracted over half a million people. But the results of the Second Annual Exposition, held March 6-13, 1920, were not considered sufficiently encouraging to warrant a third.

IT WAS NINE YEARS before another aeronautic exhibition was attempted in New York. In February, 1929, Aviators' Post No. 743 of the American Legion held a New York Aviation Show, in the Grand Central Palace again, which attracted an actual paid attendance of over 175,000. This show was repeated in 1930, and while the attendance fell off about 25,000, it was still sufficiently successful so that the sponsors have announced their intention of making it an annual event. They have not, however, succeeded in obtaining sanction from the Aeronautical Chamber of Commerce, and as a result, the Metropolitan Distributor-Dealers Section of the Chamber has organized the New York Aircraft Salon, which will be held in Madison Square Garden May 3-10. Unless satisfactory arrangements can be made for combining it with the Aviators' Post show, this is also planned as an annual event, and after so many years with none, New York may find itself hereafter with two yearly aircraft expositions.

The record of New York shows of the past is thus an uneven one. All of them have been interesting, though the financial and technical results were occasionally somewhat disappointing. On the other hand, the only three which were well publicized, in 1919, 1929, and 1930, did very well. The others received only a few scattering newspaper notices, and a majority of the general public never even knew that they were going on. That situation obviously is not likely to be repeated. On the eve of the first sanctioned New York show since the formation of the Aeronautical Chamber of Commerce, it is entertaining to recapitulate the experience of previous expositions.

The "First International Aeronautical Exhibition," in 1912, was opened the evening of May 9 to a specially invited group of people, alleged to be prominent, numbering about 5,000. During the afternoon, President R. J. Collier of the Aero Club had excited considerable interest and admiration by flying from his home at Keyport, N. J., to the side of the U. S. S. *Washington,* flagship of the Atlantic fleet, which was anchored in the Hudson River off 96th Street. He taxied his "hydraeroplane" over to the ship, and climbed on board with a rope ladder to pay his respects to Admiral Osterhaus. That novel and dramatic illustration of the possible use of aircraft for private transportation helped materially in creating interest in the exhibition.

Of the planes which were shown, several have historic interest for their achievements, others embodied novelties of design which have since been successfully developed, and yet others possessed points of originality that have sunk into merciful oblivion. The greatest attention, naturally, was given to the Wright Model "C" Flyer, a lineal descendent of the plane which had been flown at Kitty Hawk nine years before, and of the Wright planes which had been extensively demonstrated during the interval. Structurally, it did not differ greatly from its predecessors. Aside from the fact that it was built to take-off from and land on the water instead of a field, the Curtiss "racing hydraeroplane" was also fairly similar to earlier models built by the same designer.

An important novelty in this country, on the other hand, was the Burgess military tractor, the first American war machine which approximated the design of those which later came into common use. It was also noteworthy in that it was fitted with radio equipment, later successfully operated in flight. It was intended, of course, only for observation, as no military plane up to that time had been seriously designed for fighting.

The most unusual plane at the show was the Gallaudet "Bullet," a well streamlined monoplane with a large fuselage of which the nose completely housed the rotary

engine cooled through perforations in the side. The design of Edson F. Gallaudet, a pioneer who had a prominent place in the industry for many years after 1912, its streamlining foreshadowed some of the most carefully designed modern speed planes, but the flight characteristics proved to be somewhat alarming. Its propeller was mounted behind the tail unit, and was driven by a long shaft extending the length of the fuselage. This arrangement was not altogether happy, and later models were built as tractors.

The 1929 aviation show at Grand Central Palace

The largest plane exhibited was the 2,000-lb. Jacobs-Emerson multi-plane, intended to carry four passengers, which had two 35-hp. engines. Optimistic reports credited it with flight performances that would be marvelous even now, but verification was inadequate. Others were the Columbia-Christmas biplane; the Queen "Aeroboat," designed by Grover Loening; a Burgess-Wright "hydraeroplane"; a Nieuport monoplane; and others, including American modifications of foreign designs. There was also an extensive showing of aircraft engines, ranging from the Twombly seven-cylinder Gnome type rotary to the 55 hp., eight-cylinder Curtiss. Wright had a six-cylinder, 50-hp. engine. Others were the Tribert and Macomber rotary engines, the Sturtevant, Max Ams, Hall Scott, Maximotor, Roberts, Frontier, and Mead rotary-valve.

In 1917, the First Pan-American Aeronautic Exposition and Convention was organized. The exposition was held in the Grand Central Palace Feb. 8-15, and attracted a considerable interest. An admission fee of fifty cents was charged, and about 75,000 people attended. The show was sponsored by the Aero Club of America, the Pan-American Aeronautic Federation, the Society of Automotive Engineers, and the International Exposition Company. In addition to delegates from countries in Central and South America and Europe, there were representatives from the Army and Navy, the different states, colleges, aero and national defense clubs. The delegates numbered over 10,000.

Eighteen aircraft and fourteen engine manufacturers had exhibits, together with 81 exhibits of accessories, publications, equipment, etc. The Exposition and Convention were opened with a radio message from President Wilson. One advertisement was inserted in the New York *Times*, and the show was covered in one advance newspaper story, as well as a few pictures of the planes, but there was no newspaper review, and no follow-up.

Curiously enough, there were no armored machines shown, nor even any built for machine guns. None of the planes were either pursuit or bombing type. Wright-Martin Co. had the largest exhibit, which included the original 1903 Wright Flyer, side by side with a new Wright two-place reconnaissance tractor and the Wright Model V, with a 150-hp. Hispano-Suiza engine. The company also showed the Martin Model R plane, four-cylinder, 75-hp., and eight-cylinder 150-hp. Hispano-Suiza engines, built under license in this country.

Curtiss Aeroplane & Motor Company showed the J N-4 B training plane, which was already beginning to attain a reputation. A Model F flying boat was bought for private use by F. Trubee Davison, the present Assistant Secretary of War for Aeronautics. Together with these, the company exhibited a curious monster called the "Autoplane," a fairly conventional four-passenger automobile sedan body, mounted on four wheels, and surmounted with a biplane aircraft structure. The engine, in the proper automobile position, was mounted to drive a pusher propeller by means of shaft and chain. OX, OXX, V-3 and V-4 engines made up the balance of the exhibit.

New names were appearing among the other exhibitors, which were destined to become famous. L. W. F. showed a 140-hp. reconnaissance biplane, built for the U. S. Government and later built on order for the British Government. Aeromarine had a training tractor, a tractor biplane designed by Charles Willard, an eight-cylinder engine, and a seaplane float. Other planes shown were a Thomas-Morse biplane; Standard H-3 tractor with 125-hp. Hall-Scott engine; Caudron type seaplane exhibited by J. D. Cooper; Witteman-Lewis training tractor; Benoist flying boat. S. S. Pierce Company showed a small "sportsman's biplane" with a round monococque fuselage and a three-cylinder engine. The largest of the machines was a Burgess seaplane. Standard Aircraft Company exhibited uncovered wing sections and other parts, showing the steps in the construction of a plane.

The United States Government was represented by Army, Navy, Signal Corps, Bureau of Standards, Weather Bureau, Geodetic Survey, and special War Department exhibits. Connecticut Aircraft Company had a large model of a blimp with an airplane fuselage in place of the usual gondola. Goodyear Rubber Company exhibited a kite balloon, for military observation, of original design. Two American-built Le Rhone rotary

Part of the American Legion show of 1930

engines, and especially a 100-hp. Gnome rotary built by General Vehicle Company attracted favorable attention for their excellent design and workmanship. Thomas and Sturtevant both exhibited 140-hp. "aluminum" engines, while the Packard and Knox twelve- and eight-cylinder 300-hp. engines were much remarked simply because of their size. Wisconsin and Duesenberg were also among the well-known names of engine exhibitors. The Sperry Gyroscope Company showed an "automatic pilot," and a synchronized drift indicator. An important indirect result of this Exposition was the formation, Feb. 9, of the Manufacturers Aircraft Association, which helped so materially in straightening out the tangled patent situation during the War.

A SECOND Pan-American Aeronautic Exposition was planned for Feb. 16-23, 1918, and delegates were named, but it was cancelled almost at the last moment because it was not considered wise to attempt to provide transportation facilities for so many delegates and visitors in wartime. The next show, consequently, was the First Annual Aeronautical Exposition, held in (old) Madison Square Garden and the 69th Regiment Armory, March. 1-15, 1919, under the auspices of Manufacturers Aircraft Association. Naturally, war machines predominated, and it was reported that over half a million people went to see them. In any case, it was the most successful show which has been held thus far.

Among the military planes were Spad, Breguet, Caproni, S.E.5, Camel, and a German Albatross. The Martin bomber, with its two Liberty engines, and the 100-ft. Handley Page, capable of carrying five Lewis guns and a useful load of 2,000 lb., were the center of interest. The show was advertised daily in the newspapers, received a considerable amount of free publicity, including rotogravure pictures. For the first time, manufacturers advertised extensively to the general public. Curtiss Aeroplane & Motor Company had a two-page rotogravure advertisement in the Sunday *Times* during the show week, while Martin, Gallaudet, L.W.F., Caproni, and Dayton-Wright each had half a page.

Civilian planes were not entirely neglected. The Dayton-Wright Company exhibited both a "sedan" and a "Honeymoon Express," covered cockpit biplane for two passengers, adapted from the De Haviland battleplane. Gallaudet showed a small "Chummy Flyabout" monoplane which was intended to provide cheap civilian flying. There was also the Loening "Kitten," a seaplane weighing 500 lb. and had a 19 ft. wing spread.

In striking contrast were the F-5-L Navy seaplane weighing 13,000 lb. loaded, and the Caproni with 130-ft. span which had three 400-hp. Hispano-Suiza engines, Wright-Martin showed a Loening monoplane in which Major Schroeder had recently set an altitude record carrying two passengers, and Curtiss exhibited the 160-m.p.h. triplane which was then claimed to be the fastest plane in the world. Packard, Thomas-Morse and L.W.F. were also among the fourteen exhibitors of the 30 planes in the show, and there were 86 special or accessory exhibits. Goodyear had a spherical balloon, and Burgess a dirigible car intended for private as well as military observation use. It is worth noting that while the 1912 and 1917 shows were advertised and referred to entirely in the sport sections of the newspapers, this 1919 exposition was advertised in the theater sections and reviewed as an entertainment.

IN 1920, March 6-13, the Manufacturers Aircraft Association attempted to stage a strictly commercial show. Planes were priced, at from $2,500 to $50,000, and for the first time salesmen were present to interview prospects. While some military designs were present, they were largely converted for private or business use, and the machines bore such names as "Aerial Pullman," "Aerial Coupe," "Aerial Freighter," "Chicago Mail plane" and "Flying Limousine." Altogether, seventeen planes were shown by ten manufacturers, and twelve engines by seven manufacturers. In addition, there were a Goodyear eight-passenger pony blimp and nineteen other exhibits.

L.W.F. showed the "Butterfly," a monoplane with 29-ft. span, capable of 72 m.p.h., and selling for $2,500. In contrast to this was the Curtiss ten-passenger "Eagle" biplane intended for South American use. Curtiss also had the three-passenger "Oriole" and a new seaplane. Aeromarine had the "Flying Limousine," and Dayton-Wright the "Aerial Coupe." Ordnance Engineering Corporation exhibited the "Orenco Tourister," a four-place open biplane with 150-hp. Hispano-Suiza engine. West Virginia Aircraft Corporation was represented by an open three-seater, using the same engine.

The 71st Regiment Armory, in which the show was held, was especially decorated with a series of twelve large panels showing the history of trans-Atlantic and transcontinental travel. Advertisements were inserted in the newspapers daily, and the *Times* devoted space for an extensive review of the exhibits after the opening.

but there were no further notices, and apparently public interest lagged far behind the enthusiasm of the sponsors.

THERE WAS NOT another exhibition in New York until 1929, when the New York Aviation Show was inaugurated by Aviators' Post 743 of the American Legion Between Feb. 6 and 13, nearly 200,000 people paid admission to the Grand Central Palace. Sales of over a million dollars' worth of aircraft and engines were reported—largely to dealers and distributors. However, the show paid expenses and made a profit for its promoters, and is to be considered a decided success. On the other hand, due to the fact that the exhibition was not sanctioned by the Aeronautical Chamber of Commerce, very few important manufacturers exhibited planes or engines under their own names. Most of the entries were shown by distributors and dealers or operators.

Columbia Air Liners, Inc., headed by Charles Levine, contributed the feature exhibit, consisting of three planes. None of them had been extensively tested, and they now seem to have disappeared, either from lack of development or of public appreciation, so their interest must be entirely historic. The Triad, a high-wing cabin monoplane with a Whirlwind engine, had a detachable pontoon so that it could be flown as a landplane, flying boat, or amphibion, as desired. There were also an "Uncle Sam" mail plane, with an inverted Packard engine, and a small single-place sport plane with 40-hp. Salmson engine. Finally, the firm showed a 280-hp. Farman engine, plans for production of which were announced.

As a matter of fact, a number of special features attracted rather more attention than the aircraft exhibits themselves. Particularly was enthusiasm evinced for the Ruggles Orientator, which gave airminded visitors a chance to experience all the sensations of flying (or some of them, perhaps) without the inconvenience of leaving the ground. And next in attention value, probably, was the booth showing what the well-dressed aviatrix should wear, presided over by Lady Jane Mary Heath and Miss Amelia Earhart. Otherwise, there were rather too many irrelevant exhibits, such as Boy Scout equipment, motorcycles, etc., while the whole place was kept very much alive by the flights and crashes of thousands of model airplanes in the hands of demonstrators and purchasers.

Altogether, 35 planes were shown by regular exhibitors, and six by the National Guard and other organizations. There were ten engine exhibits, and 117 of accessories, apparel, jewelry, and other things. Among the other new planes were the Crescent eight-passenger Whirlwind-powered monoplane, built under the direction of Clarence Chamberlin; the Mill Basin Aircraft Corporation flying boat biplane; and the Arrow sport biplane. Exhibits of planes already well-known included Bellanca CH, Bourdon Aircraft Corporation's "Kitty Hawk"; Buhl "Special Airsedan"; Vought Corsair; Hamilton metalplane; Aeromarine Klemm; New Standard; Szekely "Flying Dutchman"; Savoia Marchetti; Moth; Avro Avian; Curtiss Robin; Alexander Eaglerock; Swallow; Ryan Brougham; Command-Aire; Travel Air; Cesna; Spartan; Monocoupe; Stearman; Advance; Laird; Stinson, Jr.; Air-istocrat. Captain Frank Hawks himself was present with his record-breaking Lockheed Air Express. Engines were less well represented, but exhibits included Kinner, Cirrus, Continental, Bliss-Titan and Neptune. Szekely, and the Belgian Renard.

Feb. 7-15, 1930, the promoters repeated the performance, in the same location. Since they failed again to receive official sanction, a smaller number of the large manufacturers was represented. The attendance fell of by about 25,000, and fewer sales were reported. Nevertheless, the show was financially successful, and offered exhibits of very considerable interest and variety, even if they were not completely representative of the industry. Once again, there were rather too many motorcycles, vacuum cleaners, and gadgets, while the air continued to be full of models and gliders. Authorities at the Grand Central station have forbidden the throwing of rice at wedding parties there because the custom caused an innocent bystander to lose the sigth of an eye last year, and it will be extraordinary good fortune if a similar accident does not result from the indiscriminate flying of toy planes at crowded shows. Since the show was "unofficial," it was perhaps inevitable that it should also include a great many models of multi-dirigibles, air-and-water liners, and other monstrosities which were sufficient to make one shudder, even in their miniature form.

Other special features, however, were excellent. A stand showing a continuous run of moving pictures of Naval flight maneuvers, and the comprehensive New York *Times* display showing famous flights, received well-deserved attention, as did two miniature airport displays to show lighting equipment. One of these, a model of the Detroit Grosse Ile airport, was particularly effective.

Seven planes were exhibited for the first time. Outstanding among these, merely by its size, was the twenty-passenger Burnelli transport with its twin Wright Typhoon engines. The Uppercu-Burnelli Company also showed the small twin-engined plane designed for the Guggenheim Safe Aircraft Contest. There were three Aeromarine Klemms, as well as the Klemm-Daimler plane which was flown around the world by Baron von Koenig-Warthausen. Among the others which made their debut were the Cairns all-metal monoplane, Liore et Olivier "Avileo" flying boat, Gee Bee side-by-side biplane, Air-istocrat low-wing racer, and Twentieth Century low-wing monoplane.

Engines were even scarcer than they had been the preceding year, though Fiat had a noteworthy showing of two racing engines. Familiar planes to be seen included Aristocrat, Bellanca, Eaglerock Bullet, Whittelsey Avian, New Standard, Travel Air, Arrow, and Swallow. A number of gliders, largely built to German designs, were shown by American Motorless Aviation Corporation, American Sailplane Company, and Aviation Engineering School. The Caddo Company contributed the S.E.-5 and Fokker D-VII war planes which had been used in the filming of "Hell's Angels."

CONSIDERING the six New York shows as a whole, it would seem that with one exception they had emphasized entertainment at the expense of commercial enterprise; and the exception, in 1920, was the nearest of any of them to failure. Now, however, the dark period is over. The public is interested, and with the aid of a reasonably good publicity staff, an aviation show in New York City can certainly be made to pay expenses, even without the help of extraneous or unairworthy exhibits. The problem, then, is to make the shows profitable to legitimate exhibitors as well as to the promoters. This will be seriously attempted for the first time at the forthcoming Salon, and is to be hoped that a worthy precedent will be established.

THE *N. Y. Show* IN PROSPECT

Exposition at Madison Square Garden, May 3 to 11, Promises to be the Largest Ever Held in the East

By LESLIE E. NEVILLE
Technical Editor of AVIATION

THE NEW YORK Aircraft Salon, which opens May 3rd at Madison Square Garden under the auspices of the Aeronautical Chamber of Commerce, will be the means of bringing to the metropolis for the first time a number of the feature exhibits of the recent middle western expositions. Despite the short period of time that has elapsed since the All-American Aircraft Show in Detroit, there will be several new airplane designs and the exposition itself will probably be the largest ever held in the East. While the underlying theme of the display is to be air transport, there will be a great many exhibits of airplanes not essentially in the transport field and it is expected that about 50 airplanes are to be exhibited, including those of sport and training types. A large selection of aircraft power plants and accessories also will be on display. The show is being managed by Clifford W. Henderson.

In order to accommodate the six of the largest transport planes, a section of Madison Square Garden has been rebuilt. Entrance ways have been torn out, seating arrangements changed and passageways made larger, mainly to accommodate these planes particularly the Fokker F-32, which drew so much attention at the recent Detroit Show as the largest American commercial land plane. In striking contrast to the mammoth Fokker plane will be shown the Aeronca, a development of the Aeronautical Corp., of America, which has attracted attention at both the Detroit and St. Louis Shows. The Aeronca is one of the smallest engine driven planes at present available on the American market.

The exhibit is to be divided into two general classes, the first to include the transport planes and the second the sport and training group, including the new amphibions that have become popular recently. The transport display will be in the main arena, while the main exhibit hall will be used to house the lighter craft. Both exhibition floors and a balcony which is to be constructed in the arena will be lined with engine and accessory booths. Due to the somewhat restricted floor space as compared with some of the western exhibits the Chamber has attempted to limit each exhibitor to a single model, which should serve to make the New York Salon an accurate cross section of the industry. Present indications are that there will be a total of approximately 130 exhibitors.

Beside the Fokker F-32 the air transport exhibit will include the Consolidated Commodore, a tri-engine Ford monoplane, a twin-engine Sikorsky amphibion and a twin hulled Savoia Marchetti S-55 flying boat and the Curtiss Condor transport. Most of these airplanes have been described in detail in previous issues of AVIATION and all of the others are scheduled for early description. Airplanes in the lighter class are to include the Barling NB-3, Stearman, Szekely Flying Dutchman, Vought Corsair, Ireland Amphibion, Travel-Air, Great Lakes Trainer, Fairchild, Waco, Gipsy Moth, Avian, Bellanca, Earle, Eagle Rock, Buhl, Monocoupe and many other planes. A Boeing fighter fully equipped with guns will represent the military type and the prize winning Curtiss Tanager also will be shown. The record breaking Lockheed Sirius used by Col. and Mrs. Lindbergh in their transcontinental flight is another feature.

PARTLY for decorative effects and partly because of space limitation several airplanes will be suspended from the ceiling of the Garden.

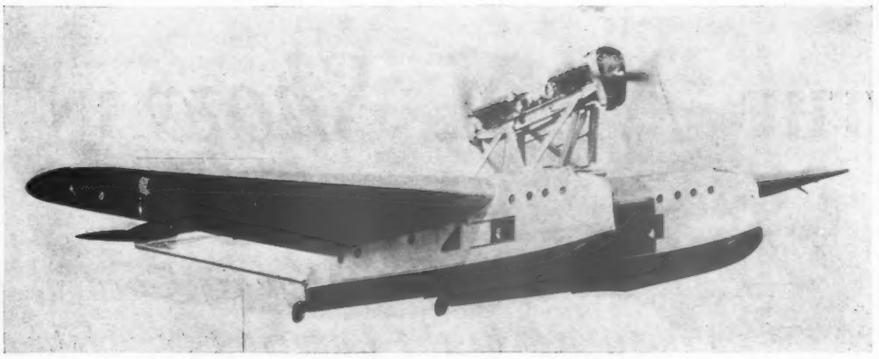
In addition to the airplane, engine and accessory exhibits during the week of May 3-10 there will be a goodly number of commercial and engineering meetings for those directly associated with the aircraft industry and special features in the form of flights and demonstrations for the spectators at the show. One of the outstanding points in the program is to be a celebration headed by Postmaster-General Walter T. Brown and held in honor of air mail pilots throughout the country. This event is scheduled for May 5th and more than 100 veteran flyers have accepted invitations to take part in the program.

The first public showing of actual photographs taken on the recent flight of Commander Richard E. Byrd over the South Pole will be a part of the Byrd exhibit sponsored by the New York *Times*.

Another one of the features of the exhibition is to be International Day, May 7th, during which practically every nation in the world will be represented through some member of its diplomatic corps or some famous flier or aeronautical leader, and some attempt will be made to summarize and compare the progress made by each of the nations represented.

Technical problems relating to the general theme of air

transport will be discussed by various authorities who are to address gatherings during a four day period of the show week. These meetings, sponsored mainly by the Aeronautical Chamber of Commerce, the Society of Automotive Engineers, and the American Society of Mechanical Engineers, will open with a session of the executive committees of the various sections of the Chamber on May 5th and close with an all day gathering of the A.S.M.E. May 8th. The S.A.E. sessions are scheduled for May 6th and 7th. A joint banquet of the Chamber and the S.A.E. will be held on the evening of May 7th and will be addressed by Frederick B. Rentschler, President of the Chamber, who will talk on the subject of "Transport Versus Air Circus."



The Savoia-Marchetti S-55, one of the features of the show

The opening session of the Chamber meetings will bring together members of the executive committees of the twelve sections of that body to discuss the general problem of aircraft merchandising. The flying school section will meet May 6th to hear a report of a committee which has investigated the feasibility of changing requirements for private and limited commercial pilots' licenses. Charles S. "Casey Jones," President of Curtiss-Wright Flying Service, will preside.

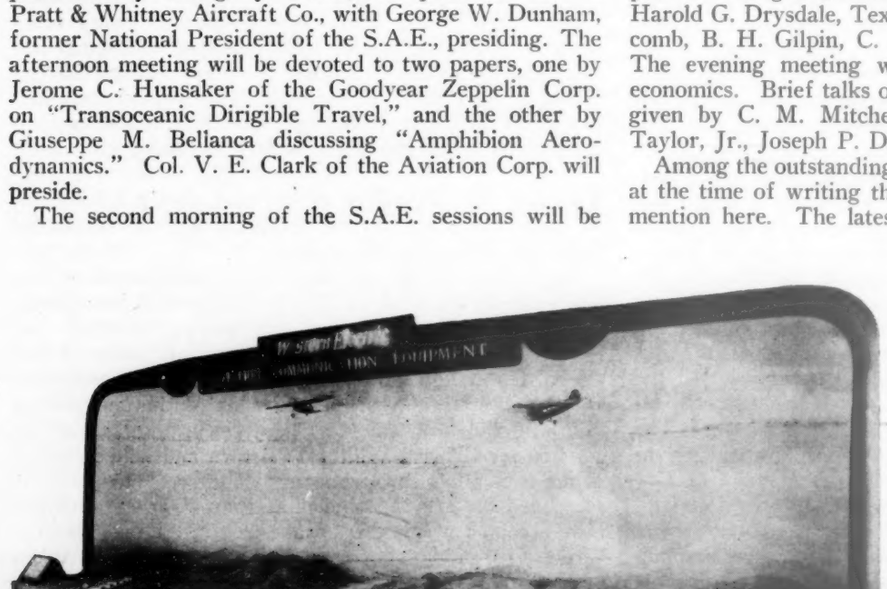
The S.A.E. sessions will begin with a paper on "The Comparative Merits of Liquid and Air Cooled Engines" presented by George J. Mead, vice-president of the Pratt & Whitney Aircraft Co., with George W. Dunham, former National President of the S.A.E., presiding. The afternoon meeting will be devoted to two papers, one by Jerome C. Hunsaker of the Goodyear Zeppelin Corp. on "Transoceanic Dirigible Travel," and the other by Giuseppe M. Bellanca discussing "Amphibion Aerodynamics." Col. V. E. Clark of the Aviation Corp. will preside.

The second morning of the S.A.E. sessions will be devoted to discussions of the Dornier Do.X and the Autogiro, the former paper to be read by Lieut. Schildhauer, who has been selected to pilot the Do.X on its transoceanic flight, and the latter by W. Laurence LePage of the Kellett Aircraft Corp. Captain Edward Rickenbacker, vice-president of the Fokker Aircraft Corp., will preside. Lieut. Alford Williams will discuss "Speed Flying" and Major Leslie MacDill of the U. S. Army Air Corps will read a paper on "Commercial Aviation in the United States from the Point of View of an Army Air Corps Officer," at the closing afternoon session.

THE MEETINGS of the American Society of Mechanical Engineers will be divided into two groups May 8th. The afternoon session will be a symposium on airplane servicing and maintenance and will include talks by Harold G. Drysdale, Tex Marshall, Major C. H. Biddlecomb, B. H. Gilpin, C. A. Parker and A. A. Gassner. The evening meeting will be devoted to aeronautical economics. Brief talks on aircraft merchandising will be given by C. M. Mitchell, Jr., Robert E. Lees, J. B. Taylor, Jr., Joseph P. Day and W. Laurence LePage.

Among the outstanding exhibits that have been planned at the time of writing there are several worthy of brief mention here. The latest improved model produced by the Comet Engine Corp. will be shown complete with the new special design manifold and cowling. This engine, although not fundamentally new, is of interest because of its somewhat unusual valve gear, which has been discussed on several occasions in articles in AVIATION. It is also expected that a new airplane recently brought out by Command-Aire, Inc., will be shown. An airplane representative of the 1930 line of the Davis Aircraft Corp. is to be exhibited and will be of interest to engineers because of its aerodynamic features which are somewhat unusual for an airplane of its size.

In addition to the Lockheed Sirius the Detroit Aircraft



One of the most interesting exhibits is that of the Western Electric Company which demonstrates communication operations

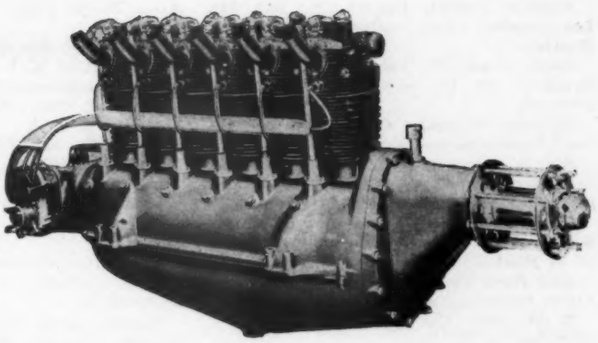
Corp. will show the Eastman Flying Yacht powered with the Curtiss Challenger engine; the new Ryan Speedster, which was introduced at Detroit; the Ryan Foursome powered with the Packard Diesel airplane engine; and the Detroit Gull, a primary type training glider. Regular flight schedules will be maintained daily by the company.

Probably the most unusual design at the show is to be the tandem plane which is the second machine of its type to have been built by the Fernic Aircraft Corp. of New York. The plane is a two-place open machine powered with the Rover engine and having a tandem wing arrangement. The main wing, whose span is 25 ft., is approximately in the conventional position for a low wing monoplane with respect to the fuselage, while the front wing, which has a 12 ft. span, is mounted above the engine on a small cabane. A three-wheel landing gear with the two main wheels behind the C.G. and the third wheel under the extreme nose is also a feature. The gross weight of the airplane is 1,400 lb.

Included in the new airplanes at the show will be a two-three place cabin monoplane powered with the Kinner K-5 engine and developed by Huntington Aircraft Inc., and a two-place training plane developed by Engineers Aircraft Inc. and powered with the Wright Gipsy engine. The Aerial Service Corp. will show for the first time in public its Mercury Chic. The exhibit of the Ford Motor Co. will constitute one of the club planes such as those exhibited at Detroit and St. Louis and which have been previously described in some detail in AVIATION.

THE AMERICAN BUILT Savoia Marchetti S-55 will also be of decided interest to American aeronautical engineers. Although previously exhibited in the middle west, the Commercial version of the Corsair land plane should be of interest to New Yorkers, particularly inasmuch as the show model is to be equipped with all the appointments necessary for business and sport flying. Representation of the line of the Stinson Aircraft Corp. will be shown by the Steffens Aircraft Co., local distributors.

Among the new engines that are to be introduced at the New York Salon are the several designs of the Isotta Fraschini Co. of Italy through the agency of its American distributor, Ugo V. d'Annunzio. Probably the outstanding feature of this exhibit is to be the 18 cylinder liquid cooled 1,800 hp. engine, which is probably the largest single unit power plant yet produced. This engine is of the broad-arrow type and is developed by order of the Italian Military Aeronautics. Other features of the company exhibit will be a 6 cylinder in-line 110 hp. air cooled engine with reduction gear and a 12 cylinder V type 450 hp. air cooled engine.



An Isotta-Fraschini air cooled, 110 hp. engine is part of that company's exhibit

Among the new American engines will be the Kimball Beetle Model K, a 7 cylinder radial rated 135 hp. at 1,850 r.p.m., and having a rather unusual valve arrangement due to its F type cylinder head. This engine is soon to be produced by the Kimball Aircraft Corp.

Another feature of the show will be an attempt on the part of the Chamber to make it possible for some 200,000 visitors to obtain airplane rides at reduced rates through the cooperation of Curtiss-Wright Flying Service, Newark Airport, Eastern Aeronautical Corp., Atlantic Air Service and Roosevelt Flying Field.

One of the novelties is to be a flight from Toronto, Canada to New York of Rin Tin Tin, famous canine movie star, aboard a Fokker Super Universal plane. The police dog is scheduled to be here for an afternoon performance at the RKO Coliseum Theater, Broadway and East 131st Street, and it is expected that, if the race against time is successful, the airplane will be purchased by the owner of the dog during the New York Show. It is also expected that a dirigible balloon will be landed on the roof of the Garden, after having transported a number of distinguished guests to the show from upstate New York. An airplane model contest of unusual proportions is scheduled to be held by American Sky Cadets.

LIST OF *Exhibitors* AT THE N. Y. SHOW

American Sky Cadets (McFadden Publications), 1926 Broadway, N. Y. City; representative, H. J. Loftus.

Abrams Aerial Survey, 800 Bauch Bldg., Lansing, Mich.; representative, Tabert Abrams.

Aero Digest, 220 West 42nd St., N. Y. City.

Aero Model Co., 111 N. Whacker Drive, Chicago, Ill.; representative, J. N. Schutte.

Aero Supply Co., College Point, L. I.; representative, F. F. Marshall.

Aeronautical Chamber of Commerce of America, 10 East 40th St., N. Y. City; representative, H. C. Bennett.

Air Associates, Inc., 535 Fifth Ave., N. Y. City; representative, H. B. Page.

Air Transportation, 1255 Broadway, N. Y. City.

Airway Age (Simmons Boardman Pub. Co.), 30 Church St., N. Y. City; representative, H. B. Bolander.

Alum. Co. of America, Pittsburgh, Pa.; representative, F. C. Shoupe.

American Airways, Inc., Chanin Bldg., N. Y. City; representative, Robt. J. Smith.

American Aeronautical Sales Corp., 730 Fifth Ave., N. Y. City; representative, C. H. Huntington.

American Tel. & Tel. Co., 60 John St., N. Y. City; representative, W. R. Newman.

Atlantic Air Service, Inc., 408 Federal Trust Bldg., Newark, N. J.; representative, M. D. Baldwin.

Aviation Engineering, 52 Vanderbilt Ave., N. Y. City; representative, B. S. Davis.

Aviation Magazine (McGraw-Hill Publishing Co.), 10th Ave. at 36th St., N. Y. City; representative, M. H. Newton.

Axelson Aircraft Engine Co., Box 337, Los Angeles, Calif.; representative, F. A. Worthey.

Balsa Wood Co. Inc., 158 Pioneer St., Brooklyn, N. Y.; representative, Jas. T. Downey.

Bellanca Aircraft Corp., New Castle, Del.; representative, Edw. I. Mayer.

Bendix Aviation Corp., South Bend, Ind.

Bendix Brake Co., South Bend, Ind.; representative, A. E. Raabe.

Bendix Stromberg Carburetor Co., 58-63 East 25th St., Chicago, Ill.; representative, A. E. Raabe.

Jean Biche and Francis Heyberger, 1 rue Alfred Stevens, Paris 9e, France.

E. W. Bliss Co., 53rd St. & 2nd Ave., Brooklyn, N. Y.

Boeing Airplane Co., Georgetown Station, Seattle, Wash.

Boeing System, Cheyenne, Wyoming; representative, W. A. Patterson.

Brenack, Inc., 95 Wyckoff St., Brooklyn, N. Y.

Brunner Winkle Co., 1-17 Haverkamp St., Glendale, Brooklyn, N. Y.; representative, William Winkle.

Buhl Aircraft Co., Marysville, Mich.; representative, Geo. B. Arnold.

Buhl Stamping Co., 2730 Scotten Ave., Detroit, Mich.; representative, W. C. Weiske.

Andrew C. Campbell, Inc., Bridgeport, Conn.; representative, A. R. Whitcombe.

Canton Drop Forging & Mfg., Flatiron Bldg., N. Y. City; representative, Martin W. Ness.

City of New York, Pier A, North River, N. Y. City; representative, Williams Lansing, Jr.

Colonial Flying Service, 270 Madison Ave., N. Y. City.

Comet Engine Corp., 20 Pine St., N. Y. City; representative, Blaine Stubblefield.

Continental Aircraft Co., 5711-92nd St., Elmhurst, L. I.

Continental Aircraft Engine Co., 12801 E. Jefferson Ave., Detroit, Mich.; representative, C. P. Russell.

Curtiss Aeroplane & Motor Corp., Garden City, L. I., representative, Mr. Clements.

Curtiss-Wright Flying Service, 27 West 57th St., N. Y. City; representative, K. E. Voelter.

Curtiss-Wright Sales Corp., 27 West 57th St., N. Y. City; representative, Stanley Jacques.

Davis Aircraft Corp., Richmond, Ind., representative, Capt. Walter C. Davis, Pres.

Detroit Aircraft Corp., Union Trust Bldg., Detroit, Mich.; representative, Pat Murphy.

Eastern Aeronautical Corp., Newark Airport, Newark, N. J.; representative, Maj. Geo. A Vaughn.

Eastman Aircraft Corp., 287 Minnie St., Detroit, Mich.

Eclipse Aviation Corp., 545 North Arlington Ave., East Orange, N. J.; representative, A. E. Raabe.

Edo Aircraft Corp., College Point, L. I.; representative, George B. Post.

Egyptian Lacquer Co., 90 West St., N. Y. City; representative, E. A. Clune.

Elgin National Watch Co., Elgin, Ill.; representative, Gordon C. Gillies.

Engineers Aircraft Co., Stamford, Conn.; representative, N. S. Niedelman.

Fernic Aircraft Corp., 3493 Richmond Terrace, Arlington, Staten Island, N. Y.; representative, V. A. Camiller.

Fleischman Transportation Co., Balso Box Department, 691 Washington St., N. Y. City; representative, G. L. Weeks, Jr.

Fokker Aircraft Corp., 1775 Broadway, N. Y. City; representative, Roy E. Russell.

Ford Motor Co., Stout Airplane Division, Dearborn, Mich.

Great Lakes Aircraft Corp., 230 Park Ave., N. Y. City; representative, C. T. Stork.

General Airplanes Corp., Buffalo, N. Y.; representative, A. L. Patterson.

Hamilton Standard Propeller Corp., West Homestead, Pa., representative, Carl B. Schory.

Haskelite Manufacturing Co., 120 S. LaSalle St., Chicago, Ill.; representative, Mr. Fitzpatrick.

Harwen Products Co., 16 Morningside Ave., N. Y. City; representative, P. O. Stewart.

Huntington Aircraft Corp., 587 Broad St., Stratford, Conn.; representative, Howard Huntington.

Imperial Brass Mfg. Co., 1200 West Harrison St., Chicago, Ill.; representative, F. C. Shafer.

International Nickel Co., Inc., 67 Wall St., N. Y. City; representative, H. S. Lewis.

Ireland Aircraft Inc., Garden City, L. I.; representative, W. R. Harfurth.

Irvin Air Chute Co., 372 Pearl St., Buffalo, N. Y.

Isotta Motors, Inc., 119 West 57th St., N. Y. City; representative, U. V. D'Annunzio.

Kendall Refining Co., Bradford, Pa., representative, I. H. Shearer.

Walter Kidde & Co., 140 Cedar St., N. Y. City; representative, J. T. Forester.

Kimball Motor Co., Naugatuck, Conn.; representative, Leo Kimball.

Kinner Airplane & Motor Corp., 635 W. Colorado Blvd., Glendale, Calif.; representative, R. Ernest Tucker.

LaRoe Airways, Inc., 220 W. 42nd St., N. Y. City; representative, Dr. Arthur LaRoe.

Light Mfg. Co., Pottstown, Pa.; representative, H. J. Bahr.

Lockheed Aircraft Corp., Burbank, Calif.

Manasco Motors, 6718 McKinley Ave., Los Angeles, Calif.; representative, A. Menasco.

Mercury Aircraft Inc., Hammondsport, N. Y.; representative, J. F. Meade.

Mono Aircraft, Inc., Moline, Ill.; representative, R. A. Cole.

Museum of Peaceful Arts, 24 West 40th St., N. Y. City; representative, E. E. Fairbanks.

National Air Pilots Ass'n, 1293 Blount St., Cleveland, Ohio; representative, Carl Egge.

New Standard Aircraft Corp., Paterson, N. J.; representative, Miss M. Colvin.

New York Aircraft Distributors, Inc., Roosevelt Field, Garden City, L. I.; representative, Lyndon M. Brown.

N. Y. Rio & Buenos Aires Lines, Inc., 420 Lexington Ave., N. Y. City; representative, R. A. O'Neill, Pres.

New York Telephone Co., 140 West St., N. Y. City.

New York Times, Times Square, N. Y. City; representative, N. C. Puckette.

Newark Air Service, Newark, N. J.; representative, Capt. A. O. Donaldson.

Packard Motor Car Co., Detroit, Mich.; representative, G. H. Brodie.

Pan American Airways, Inc., 122 E. 42nd St., N. Y. City; representative, C. C. Piper.

Paramount Aluminum Welded Products, 195 Morgan Ave., Brooklyn, N. Y.

Parker Appliance Co., 10320 Berea Rd., Cleveland, Ohio; representative, W. L. Parker.

Parks Air College, Inc., 3608 Chanin Bldg., N. Y. City; representative, Wallace T. Backus.

Parks Aircraft, Inc., Box 681, E. St. Louis, Ill.

Peel Gliders, Inc., Box 111, College Point, L. I.; representative, Mr. Zelcer.

Penna. R.R. Co., 390 7th Ave., N. Y. City; representative, D. C. Fagans.

Pioneer Instrument Co., 754 Lexington Ave., Brooklyn, N. Y.; representative, A. E. Raabe.

Pitcairn Aviation Inc., Sperry Bldg., Manhattan Bridge Plaza, Brooklyn, N. Y.

Pratt & Whitney Aircraft Co., Hartford, Conn.; representative, Stanley Hedburg.

Radiomarine Corp. of Amer., 66 Broad St., N. Y. City; representative, W. G. Logue.

Rainbow Light Inc., 21-43-44 Rd., L. I. City, N. Y.; representative, M. L. Hull.

Richfield Oil Corp., 122 East 42nd St., N. Y. City; representative, Fred L. Foster.

H. H. Robertson Co., 475 Fifth Ave., N. Y. City; representative, K. B. King.

Roosevelt Field, Inc., 119 West 57th St., N. Y. City; representative, P. E. Gillespie.

Russell Parachute Co., 122 East 42nd St., N. Y. City.

Ryan Aircraft Corp., Lambert Field, Robertson, Mo.

Scintilla Magneto Co., Sidney, N. Y.; representative, A. E. Raabe.

Seaboard Aircraft Corp., 225 Broadway, N. Y. City; representative, Arthur K. Ransom.

Shelton Looms, 1 Park Ave., N. Y. City; representative, G. B. Matthews.

Sikorsky Aviation Corp., Bridgeport, Conn.

Sinclair Refining Co., 45 Nassau St., N. Y. City; representative, L. P. Lochridge.

A. G. Spalding & Bro., 105 Nassau St., N. Y. City; representative, H. R. Hart.

The Sportsman Pilot Magazine, 551 Fifth Ave., N. Y. City; representative, John S. Reaves.

Stanavo Specification Board, Inc., 1911 Chanin Bldg.; representative, E. E. Aldrin, V.P.

Standard Oil Co. of New York, 230 Park Ave., N. Y. City; representative, B. E. Baker.

State of New York, State House, Albany, N. Y.; representative, Mr. Webb.

Stearman Aircraft Co., Wichita, Kan.; representative, J. E. Schaefer.

Steffens Aircraft Corp., 96 Park Ave., Rutherford, N. J.; representative, Emil W. Steffens, Jr.

Stewart-Hartshorn Co., 230 Fifth Ave., N. Y. City; representative, J. M. Layng.

Stout Air Services, Inc., Ford Airport, Dearborn, Mich.

Summerill Tubing Co., Bridgeport, Pa.; representative, S. L. Gabel.

Texas Co., 17 Battery Place, N. Y. City; representative, H. N. Porter.

Time, Inc., 205 East 42nd St., N. Y. City; representative, O. D. Keep.

United Aircraft & Transport Corp., 230 Park Ave., N. Y. City; representative, George S. Wheat.

Vacuum Oil Co., 61 Broadway, N. Y. City; representative, E. J. Snow.

Verville Aircraft Corp., 7424 Melville Ave., Detroit, Mich.; representative, A. V. Verville.

Chance Vought Corp., Review & Borden Ave., L. I. City, N. Y.

Waco Aircraft Corp., Troy, Ohio; representative, B. D. Spofford.

Warner Aircraft Corp., Detroit, Mich.; representative, Willis C. Brown.

Westchester Airport Corp., 122 East 42nd St., N. Y. City; representative, D. J. Barrett, Jr., Pres.

Whittelsey Mfg. Co., Inc., Bridgeport, Conn.; representative, F. H. Calladay.

Geo. A. Wies, Inc., Roosevelt Field, L. I.; representative, George A. Wies.

Wright Aeronautical Corp., Paterson, N. J.; representative, E. E. Hughes.

Western Electric Co., 195 Broadway, N. Y. City; representative, E. V. B. Van Pelt, Jr.

Wyman-Gordon Co., Worcester, Mass.; representative, H. E. Wellington.

TENTATIVE PROGRAM FOR THE

New York Show

May 3, Inaugural Day

12 Noon to 1 P.M.—Army Air Corps Maneuvers over city.

3 P. M.—U. S. Navy Dirigible "Los Angeles" and Metalclad Dirigible ZMC2 fly over city.

6 P. M.—Air Show opens.

6 P. M. to 7 P. M.—Music program by Bronx County Drum and Bugle Corps, American Legion, at Madison Square Garden.

8 P. M.—Hon. Grover A. Whalen, Police Commissioner, and party including Rodman Wanamaker 2nd, Aviation Aide to the Commissioner, review New York Air Show.

8.15 P. M.—Address: Hon. Grover A. Whalen.

8.30 P. M.—Address: Frederick B. Rentschler, president Aeronautical Chamber of Commerce of America.

9.00 P. M.—Famous fliers visit show.

12 Midnight—Show closes.

May 4, Educational Day

12 Noon—Show doors open.

2.30 P. M.—U. S. Navy's Crack Fighting Squadron from Aircraft Carrier "Saratoga" Arrives from Hampton Roads, Virginia. Formation flying over city.

3 P. M.—Address: Prof. Roland H. Spaulding, in Madison Square Garden.

3.15 P. M.—Address: Lieut Commander John W. Iseman, Commander 3rd Naval Training Squadron, Rockaway Beach, L. I.

8.30 P. M.—Address: Colonel Charles A. Lindbergh.

8.30 P. M.—Pilots of U. S. Navy's crack squadron from aircraft carrier "Saratoga" visit show and are introduced over microphone.

11 P. M.—Show closes.

May 5, Air Mail Pilot's Day

12 Noon—Show doors open.

12.30 to 1.30 P. M.—U. S. Navy Fighting Squadron from Aircraft Carrier "Saratoga" in maneuvers over New York City.

3 P. M.—Address: W. Irving Glover, assistant postmaster general in charge of air mail, on "Pioneering the Air Mail."

3.15 P. M.—Address: James C. Edgerton, first Air Mail Pilot, "The Story of the First Air Mail."

4 P. M.—Reunion Veteran Air Mail Pilots at National Air Pilots' Association Booth.

8.30 P. M.—Address: Hon. Walter F. Brown, Postmaster General of the United States, on "Building Our Air Mail on a Sound Basis."

8.45 P. M.—Address: E. Hamilton Lee, veteran of air mail pilots.

9 P. M.—Leaders from U. S. Navy's Fighting Plane Squadron Introduced over microphone: Pilots of Squadron guests at show.

11 P. M.—Show closes.

May 6, Famous Fliers' Day

12 Noon—Show doors open.

12.15 P. M.—U. S. Navy's Crack Fighting Squadron from U. S. S. Saratoga fly over New York City in formation before returning to Hampton Roads, Virginia.

3. P. M.—Adress: Amelia Earhart.

3:15 P. M.—Address: Colonel Clarence Chamberlin.

3.30 P. M.—Famous Fliers attending show are introduced to public.

8.30 P. M.—Address: Frank Hawks.

8.45 P. M.—Address: Roger Q. Williams.

9. P. M.—Famous Fliers Attending show introduced to public.

11 P. M.—Show closes.

May 7, International Day

12 Noon—Show doors open

1 P. M.—Foreign diplomatic officials visit the show.

3 P. M.—Address: Major Georges Thenault, French Air Attaché.

3:15 P. M.—Address: Colonel Ralph A. O'Neill, president of New York, Rio and Buenos Aires Air Line.

8:30 P. M.—Address: Colonel James C. Fitzmaurice, co-pilot of only plane to cross Atlantic from East to West, "Bremen."

8:45 P. M.—Address: John T. Trippe, president, Pan American Airways.

9 P. M.—Visiting foreign diplomats see show.

9:30 P. M.—Charles L. Lawrance, president of Islip Airport and the designer of the Wright Whirlwind engine, will speak over the microphone on Long Island Day program.

10 P. M.—Address: J. P. Muller, chairman, Long Island Chamber of Commerce, Aviation Committee.

11 P. M.—Show closes.

May 8, Transportation Day

12 Noon—Show doors open. Transportation executives guests of show.

3 P. M.—Address.

3:15 P. M.—Address: S. J. Denton, commissioner, United States Shipping Board.

8:30 P. M.—Address: P. W. Chapman, president United States Lines.

8:45 P. M.—Address: Colonel Clarence M. Young, Assistant Secretary of Commerce for Aeronautics.

11 P. M.—Show closes.

May 9, Army and Navy Day

12 Noon—Show doors open: Officers of Army and Navy Air Services guests of show.

12 to 1 P. M.—Army Air Corps Maneuvers Over New York City.

1:15 P. M.—U. S. Navy Dirigible "Los Angeles," Metalclad Airship "ZMC2" and Navy blimps parade over New York City.

3 P. M.—Address: Hon. F. Trubee Davison, Assistant Secretary of War for Aeronautics.

3:15 P. M.—Address: Rear Admiral William A. Moffett, Chief Bureau Aeronautics of U. S. Navy.

8:30 P. M.—Address: Hon. David S. Ingalls, Assistant Secretary of the Navy for Aeronautics.

8:45 P. M.—Address: Brig.—Gen. Benjamin D. Foulois, U. S. Army, first army pilot.

11 P. M.—Show closes.

May 10, American Youth Day

12 Noon—Show doors open.

1 P. M.—Model airplane contestants visit show.

3 P. M.—Address: Captain Lewis A. Yancey, New York to Rome and New York to Bermuda Flier.

3:15 P. M.—Address: Hawley Bowlus, America's premier glider pilot who taught Colonel Lindbergh to glide.

3:30 P. M.—Awarding of Prizes to Winners of Model Airplane Contest by Charles S. "Casey" Jones.

May 11, Women Pilot's Day

12 Noon—Show opens: Women pilots guests of show.

3 P. M.—Address: Louise Thaden, winner Trans-continental Woman's Air Derby.

3:15 P. M.—Address: Ruth Nichols.

8:30 P. M.—Address: Ruth Elder.

8:45 P. M.—Address: Blanche Wilcox Noyes.

11 P. M.—Show closes.

State Control OF AVIATION

A Review of the Task of Building up the First Department and How it has Brought Air Regulation

An Interview With

CAPT. CLARENCE M. KNOX
Connecticut Aviation Commission

By A. B. SANDS

"THE plan of state control of aviation now in operation in Connecticut, has been a number of years in reaching its present state of development. As far back as 1911, Connecticut attempted its first control by licensing pilots and machines, under the Secretary of State. [Thereby becoming the first state to make the attempt.—Ed.] Ten years later jurisdiction was given to the Motor Vehicle Commissioner. That already overburdened official realized that there would be ultimate need of a comprehensive regulatory aviation program and, as an initial step, appointed a group of civilians, of whom I was one, as aviation inspectors for the Motor Vehicle Department. We gave practically all of our time for a number of years, in our desire to see the state become air-minded. An air meet in 1922, bringing with it many previously unencountered problems of regulation, and a memorable incident at New Haven where thousands of lives were endangered by reckless flying over the Yale Bowl, necessitated the prompt administration of measures sufficiently potent to prevent further occurrences of the same sort and were the incentives to legislative action. In 1923 future planning and some one paid inspector was secured, by 1924 office space was assigned for state aviation work and in 1927 a separate department was created by act of the legislature and I was placed in charge.

"In the meantime the city of Hartford was in itself becoming air-minded and the activities of the state officials aided by Hartford residents who were anxious to see the city take a recognized place in aviation, had culminated in the acquisition of meadows to the south of the city, already owned by the municipality, and their development as an airport. Under our direction, over 8,000 trees had been removed, land filled and proper drainage installed. An Aero Squadron was organized, Brainard Field accepted as a recognized airport and flying facilities were thus made available, coincidentally with the assumption by the state of jurisdiction over aeronautical affairs.

"THE WAR left us with an accumulation of machines, built in an early experimental period and for war work. For the most part they were unwieldy and obsolete, from the very purpose of their construction and it has taken years to get rid of them. The men who were fliers were trained in war and its tactics. To the great majority of them flying meant war and all that went with war and they wanted to get out of it. We had a market glutted with machines and short of fliers. Then came the

Commissioner Knox and Captain Generous, Deputy Commissioner in the State plane

IN CONNECTICUT

State Aeronautics About

Captain Knox at his desk

after-war group—men who carried on the development of new types of machines, who have experimented in the commercial use of planes and development of airports and who have just begun to touch the development of the private plane for the private user.

"After them, what? We have thousands of a younger generation, boys who are teaching us the fallacy of our old theories that youth has no place in the technical field. Radio development proved how wrong we were and the business-like way in which these boys of to-day are studying aviation in all its aspects, from gliders to the most complicated plane, must make us realize, if we are not entirely blind, that it will not be more than a very few years before aviation will be given a tremendous impetus. Are we then to be found wanting in having thrown away our day of preparation? Can we sit by and let a situation develop that will cause far more drastic and certainly less intelligent regulation, because hurried and unthought-out, when we have the remedy in our own hands now? Experimentation is necessary—let it come now.

"The whole emphasis, through this country so far, has been put upon regulation of plane and pilot and protective devices for them, all of course absolutely necessary. To my way of thinking, however, we can at best have an ill-balanced program if we are to overlook that great and important claimant to consideration—the public. I do not believe in governmental interference with private enterprise, but I do not believe either, that there is anyone who can question the need of preventing the employment of improper personnel and equipment in aviation.

Headquarters of the Aeronautics Department at Brainard Field

"Who then can best do the regulating? I am very definitely of the opinion that there is a job for the municipalities, a job for the states and a job for the Federal Government. What the Federal Government is doing now is admirable as far as it goes and we are bending every effort to support it and to harmonize our laws with theirs so far as compatible with circumstances surrounding safety control in the state. The Federal Government cannot, however, through sheer lack of man power and vast expanse of territory, do what a state can do in some very important lines and it is of course restricted to control of interstate traffic.

The essential provisions of the Connecticut laws, for the sake of convenience might be grouped in about six divisions. In the first come those providing for the appointment of a Commissioner of Aeronautics to hold office for four years, who shall enforce the statutes concerning aeronautics, report biennially to the Governor, appoint assistants, and may repeal or alter the administrative provisions of the aeronautical laws as he finds necessary or desirable. An Advisory Board on Aeronautics, of seven members, to serve four years each, without remuneration, is also created."

Registration of resident planes is compulsory in Connecticut and a number is assigned only after the aircraft is inspected and passed for safety requirements. The fee is $25 for a full year, $15 after June 30. Manufac-

turers may secure a special permit for experimental, test and other purposes, covering all their planes, for $50. Other experimental craft may be registered for test purposes in the vicinity of a recognized airport, for $2.

All pilots (except those from other states, who are dealt with separately and are discussed later in this article) must be licensed, the license to be issued after a satisfactory examination by an inspector of aeronautics and the state Director of Personnel Inspection. A limited commercial or transport pilot must be either a citizen of the United States or a citizen of a foreign country which grants reciprocal privileges with the United States. He may operate an aircraft for hire over a designated area, but shall not instruct students. A commercial pilot may operate for hire or for instruction from any commercial airport. A transport pilot 'may operate any aircraft which his training shall permit, for any purpose not contrary to the provision of this act.' The fee for the initial physical examination for any applicant for a pilot's license is $15; for the license itself $5. Ten dollars is required for the annual physical examination of any pilot and $5 for the semi-anual examination.

Every holder of a license or owner of a registered plane must file notice of change of address and of any substantial change in appearance or equipment of a plane. Any pilot, whether resident or non-resident, of a plane involved in an accident resulting in personal injury or property damage must make a written report of such accident to the Commissioner within 24 hours. He is held responsible for damages to persons or property directly attributable to negligence on his part and if employed by or acting as the agent of another, both employer and pilot are held responsible for injuries, but only when they result from negligence of the pilot.

No pilot is permitted to do acrobatic flying while carrying passengers except when instructing students, nor to operate commercially from any airport or landing field which has not been approved by the state. No aircraft may be left with the engine running and unoccupied by a competent person, nor may it carry more passengers than the registered seating capacity.

No plane may be operated at a height of less than 2,000 feet when engaged in acrobatic manoeuvers, flying over any thickly settled community, or over any celebration, game, etc., where failure of the plane to function properly would result in serious damage to property and loss of life. Special permits are granted for photographic flights.

No tools, handbills, containers, etc., may be thrown from any plane, but the Commissioner may waive any such regulation for charitable or similar affairs.

Except in emergency instances no parachute jumps may be made from an aircraft in flight, unless the person is a licensed parachute jumper. A first aid kit, fire extinguisher and safety belts for pilot and passenger are required on all types of aircraft and specific regulations are enforced in regard to the care and use of parachutes for students and others.

The state, like the Federal Government, requires uniform lighting for various types of aircraft between one-half hour after sunset and one-half hour before sunrise:

Airplanes: A green light on the right side and a red light on the left, each showing unbroken light between two vertical planes whose dihedral angle is 110° when measured to the left and right, respectively, from dead ahead. They must be visible at least two miles away.

At the rear and shining rearward, a white light visible in a dihedral angle 140° bisected by a vertical plane through the line of flight. To be visible at least three miles away.

Airships: Same as airplane except that the side lights must be doubled horizontally in a fore and aft position and the rear lights doubled vertically. Lights in a pair to be seven feet apart, at least.

Balloons: A free balloon must display one white light not less than twenty feet below the car and visible for at least two miles. A fixed balloon or airship must carry three lights, red, white and red, in a vertical line one over the other, visible at least two miles away. The upper light must be not less than twenty feet below the car and the spacing between the lights must be not less than seven nor more than ten feet.

WHEN STATIONARY, the lights on all aircraft which are on the surface of the water and not under control or moored or anchored in navigation lanes, must show a white light visible for at least two miles in all directions. Mooring cables must show groups of three red lights not more than one hundred feet apart and the object to which the balloon is moored must be similarly marked.

The state must approve any site selected by a municipality for an airport and the Commissioner may sanction the taking of additional land for just compensation, in the case of fields established prior to the passage of this act. He may, upon authorization by the Superior Court of a county, close or re-locate any highway which interferes with the safety or enlargement of a field, although he must procure consent from the Highway Commissioner if a trunk or state-aid highway is involved. He is authorized, furthermore, to require the removal of any obstacles that may imperil aerial navigation or the operation of an airport and to establish safety zoning regulations governing the area adjacent to any airport.

"With regard to our ruling that permits a 16-yr.-old boy to obtain a student pilot's license I might say that such permission is based on our personal inspection. A boy may, but there is no assurance that he will, secure that license, any more than any other applicant and he cannot of course take passengers for hire.

"Personnel Inspection Department is the name given to the very important division of the Aeronautics Department that includes first of all the customary medical inspection, but goes further. Every applicant must have the Wasserman test for epilepsy and if the disease is there, either in dormant or active form, Connecticut will not grant a license. Assuming, however, that the applicant has passed his medical tests and has taken his required instruction, he may not even then be considered capable of handling a plane. His past record must show a sense of responsibility, he must not be careless in his associations nor irresponsible in his actions, in short he is judged as a man upon whose judgment and inherent stability of character as well as technical skill, will depend the safety of human lives and immensely valuable property.

"I believe it is just as important for our Personnel Director to see the men on the field and to watch them under varying conditions as it is for him to see them in his office. That is why I ask him to attend large air meets whenever it is practical for him to be away. He sees aviators from all walks of life and he gains each time more and more valuable experience as to their reactions both to the expected and the unexpected.

"I do not want you or anyone else to assume for one minute that we expect our men to be anything but human. There is a certain dare-deviltry that is inborn in every pioneering spirit and that is the spirit that makes aviator. They work hard and we know that they will play as hard, but underneath it all are other fundamental characteristics that will make a man dependable or not. Surely it is more reasonable to exert greater care in the first selection of men that it is to keep adding something at the other end in an attempt to combat, by more and more expensive schooling, inherent faults that can never be overcome. Up to the present time, too, our laws seem to have been constructed for the benefit of those passengers who hire their passage and thus come under the protection of commercial pilot regulations. Is not some protection due those who fly with pilots licensed to take non-paying passengers?"

The proof of these theories of Captain Knox would seem to lie in the state's statistics. Under regulated flying, there has been but one fatality in seven years, among Connecticut licensed pilots, and that accident was attributed to an improperly designed plane which was barred from the state. These figures for 1929 show a healthy activity and interest in aviation, from the number of planes and pilots licensed, and would certainly abolish the illusionary theory that restrictions such as are in effect there will cause any shortage in pilots. For example:

Pilots licensed in 1929	234
Transport	4
Commercial	67
Limited Commercial	18
Private	32
Student	103
Parachute	9
Balloon	1
Planes registered in 1929	127
Inspections on planes in 1929	1,595
Physical examinations	401
Made for the Connecticut Department	342
Examined from surrounding states for the Dept. of Commerce	59
Fees to December 1, 1929:	
Registrations	$2,159.00
Pilot's licenses	1,175.00
Physical examinations	3,935.00
Field inspections in 1929	15
Approved	10
Disapproved	3
Doubtful	2
Accidents in 1929	38
Out of state	1
Fatal—no Connecticut licensed pilots or Connecticut registered planes involved. Seven fatalities	4
Serious property damage to plane. One foreign plane	13
Serious personal injury. One unlicensed pilot	2
Slight property damage to plane	19
Foreign planes	1
Slight personal injury	10
Property damage to other than aircraft	0
Suspensions:	
Pilots' licenses suspended	6
Right to operate in Connecticut forfeited	1

"The Federal authorities must always, in my opinion, control interstate transport. An adequate number of inspectors to cover the necessary fields can easily be procured and supervision can be maintained without undue difficulty, from Washington. Pilots for this special type of work must be under Washington supervision, also.

"The producing of planes and all productive work should naturally be considered as part of our nation-wide industrial program and the necessary inspection should be the duty of the Federal Government.

The Connecticut Aeronautics Department's Vought "Corsair"

"Our government should, in my opinion, maintain a research bureau that may constantly strive for improvements in all divisions of aeronautics. It should also maintain a conference bureau engaged in gathering up-to-the-minute information on traffic and other conditions, which shall call into conference the authorities of various states as frequently as may be considered necessary for the coordination of the states' work.

"Policing is a state job. The state has been proven to be the most effective unit in land affairs and its province is equally clear in aviation. It is large enough to avoid subjection to local influences that hamper efficient work and yet small enough to cover its territory with scrupulous efficiency. The state aviation force should be authorized to handle violations of Federal regulations. It should pass judgment on whether a plane is maintained properly and kept in safe flying condition but it should not be asked to determine whether a plane is fundamentally proper in design.

"THE AERONAUTICAL ACTIVITIES of municipalities of course may be many and varied but their most important work at the present time, as I see it, is in the development of landing fields and the policing and enforcement of all air regulations, at the airports. I believe, in fact, that the latter should become part of the city ordinances, to give city officials proper jurisdiction. The establishment of fields calls for intelligent and skillful planning if much money is not to be wasted and Connecticut requires a town to secure the state's approval of the location of its proposed field. It is thus in a position to give that community much helpful advice and to insure a continuity of development throughout the state that should be saving of taxpayers' money and helpful to commercial flying.

"Absurd misunderstanding to the contrary, there is nothing, nor will there by anything in Connecticut's laws, that savors of lack of welcome to the flier from other parts who may drop into its midst either expectedly or unexpectedly. If he is in trouble he will receive generous and whole-hearted help. He may fly within the state for thirty days without securing a license, provided he carries on no commercial flying and provided he holds either a Federal license or one from another state. He is asked to observe the laws of Connecticut in regard to the operation of planes in exactly the same manner that he would observe the motor vehicle laws of any section, reporting his presence, on arrival, to this office."

Alaskan Airways MAKE RAPID PROGRESS

Development Thus Far Has Speeded Up Travel in the Interior and

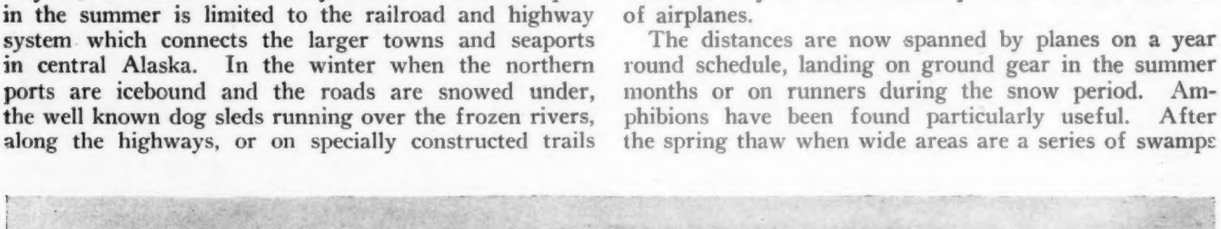
By KENDALL K. HOYT

AFTER half a century of slow ground methods, Alaska is speeding advancement by pioneering from the air. Not only are flight explorations bringing the development of pulpwood, minerals, and other resources from a remote possibility to a not far distant fact, but a network of airways has sprung up to serve the settled regions on a sound commercial basis. Seventy-one landing fields already have been constructed in addition to those supplied by nature and more are in progress. Air taxis are available at the principal towns for freight, mail, and passenger service to all points in the territory.

What this means in linking scattered communities with each other and with the outside world may be appreciated from the fact that the mileage spread of Alaska is as great as that of the United States and the land area one-fifth as great. This vast expanse is populated by only 30,000 whites and as many natives. Land transport in the summer is limited to the railroad and highway system which connects the larger towns and seaports in central Alaska. In the winter when the northern ports are icebound and the roads are snowed under, the well known dog sleds running over the frozen rivers, along the highways, or on specially constructed trails were the only means of travel prior to the introduction of airplanes.

This article is based on the observations of E. W. Sawyer, executive assistant to Secretary of the Interior Wilbur and on the comment of other Washington officials dealing with Alaskan development. Mr. Sawyer recently returned from an extensive tour of Alaska for his Department, 2000 miles of which was by air routes

The distances are now spanned by planes on a year round schedule, landing on ground gear in the summer months or on runners during the snow period. Amphibions have been found particularly useful. After the spring thaw when wide areas are a series of swamps



Four of the planes operating joined the field at Nome, Alaska. Photograph taken June 21, 1929

Has Benefited Industry in General

Above: The field at Fairbanks, Alaska, in the winter of 1928. Below: An active trio in Alaskan aviation. —left to right, Maj. Malcolm Elliott, Ernest Sawyer, and Pilot Bennett

and pools, infested with countless flies and mosquitos, other means of travel would be impossible. Numerous lakes furnish good summer landings along the airways. Beaching facilities have been provided at several of the seaports.

A comprehensive program of air field construction is being handled mainly by the Alaskan Road Commission under its president, Maj. Malcolm Elliott of the Corps of Engineers, working with co-operative funds advanced by the Federal Government, the Territory of Alaska, and local communities. In addition to the regular work of clearing, grading, and removal of boulders, the Commission supervises the erection of shelter cabins and telephone lines to the airports. Thus the airways are regarded by the government as a regular part of the transport system.

WITH a through highway from Seattle to Fairbanks being considered as the next logical step in Alaskan development by both the United States and Canadian governments, the use of airplanes takes on a new significance. Already more than half the distance has been spanned by road and present negotiations give reason to believe that the last gap will be closed within the next few years. But such a road will be blocked by snow six months out of the year leaving an established route which, for long jumps, doubtless will be flown during this period. Aside from the obvious saving in time, air transport may be in many instances cheaper than other methods even for fairly heavy commodities. Under extreme conditions in the past, haulage charges have run as high as $50 per ton-mile, a heavy burden on interior projects. It is said that the highway system already has paid for itself several times over, saving at a guess $2,000,000 per year. There is no doubt that, proportional to the invested capital, the airways are on as sound an economic basis. Commercial firms seem to think so as shown by the recent merger of Alaskan lines.

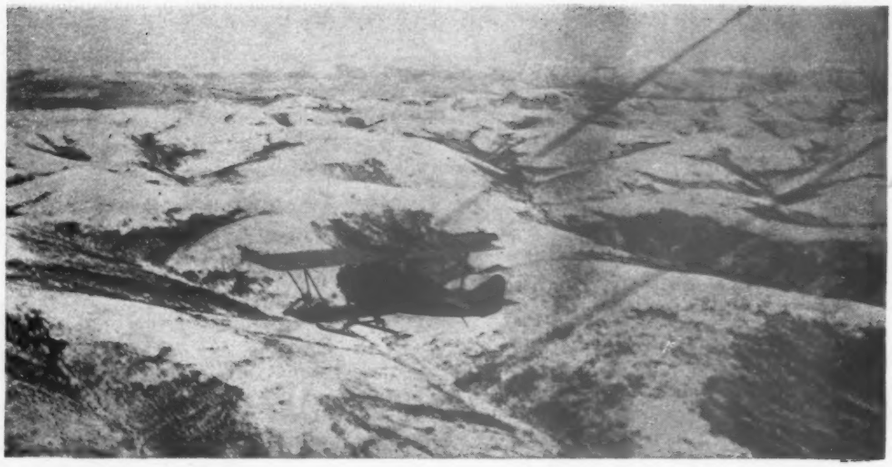
It is not possible to estimate the value of airplanes, parts, and accessories which have gone into Alaskan use because the Commerce Department figures are not broken down to show these items, and because there is apparently no record of planes which have been flown into the territory to remain. Using Commerce statistics in which planes and parts are of principal value, though some other things are included, the rate of growth in exports from the United States to Alaska may be shown by these figures as an index: $80,000 for 1926; $130,000 for 1927; and $170,000 for 1928. Though not yet large compared with domestic output, these sums are a good showing for an infant enterprise and promise a profitable business for American firms in years to come.

SO FAR, the main use of planes in Alaska has been for interior flights rather than for outside connections. However, such pioneer flights as those of Capt. Ross G. Hoyt last summer indicate the feasibility of a regular service to connect the airlines of the United States with those of Alaska. The overland route is now unfavorable because landing facilities are not of the best. With a series of fields provided in the British Columbia and Yukon towns east of the coast range, such as Hazleton, Atlin, Kluane Lake, etc., and at numerous points inland, it would be possible to get into Juneau or Fairbanks in safe and easy stages whence all Alaskan fields are readily accessible.

The Pacific coast route is better though not on a regular schedule, planes have gone back and forth without mishap. From Los Angeles to Juneau is not a difficult two-day flight with a stopover at Seattle. Landing fields on the coast of British Columbia and on the

Alaskan panhandle would be a material aid and are projected.

One of the difficulties of Alaskan flying is the rapidly changing weather and the preponderance of rain and fog during the spring and summer. As an aid to aviators, up-to-the-minute weather information is telephoned to most of the fields from the Signal Corps radio stations which are set up at all important points. A weather bureau station has recently been established at Fairbanks to further this purpose.



An example of cross country flying during the winter months in Alaska

It is believed that within a comparatively few years Alaska will be an important link in an established air route from the United States to the Orient. Advancing industrial conditions in Japan and Manchuria will demand it. The difficulties are less than in the case of transatlantic flying because the Oriental route would be mostly over or near land. A great circle of the earth describing the shortest distance between New York and Tokyo passes a little south of Fairbanks and Nome, showing their strategic position in future air transport. Aside from the non-commercial flights which prove the possibility of such a route, one enterprising pilot recently went into Siberia and flew back to Alaska with a small fortune in high-grade furs. It is conceivable that there will be times when the saving of a week in the shipment of silks or other de luxe commodities from Japan might make the added cost of air transport worth while to American concerns.

Returning again to the direct effect of aviation on Alaskan development, outstanding service has been rendered by the Navy planes which set out on a second expedition last summer to map large areas by air methods for the U. S. Geological Survey. (AVIATION, Dec. 21, 1929.) Four Loening amphibions accompanied by the tender Gannett and a barge to house the photographic and machine equipment and the technical personnel have been mapping some of the larger islands and shore regions near Juneau. The Geological Survey working in the interior has sent its parties in during the past two years, thus lengthening the field season by a matter of weeks. Formerly the slow progress of pack trains to the point where mapping was to commence has been so slow that the men had to come out again to avoid the oncoming winter almost before they had fairly begun.

At a conservative estimate, air mapping is said to have set ahead the utilization of vast mineral, pulpwood, and power reserves by at least several years. Large areas of Alaska are still unexplored as illustrated by an incident on E. W. Sawyer's recent trip. Forced off course by fog, he discovered in a region hitherto supposed to be barren, a tract of 4,000,000 acres which will be excellent for reindeer grazing, forming an oasis, so to speak, when driving the animals overland.

SUMMING UP aeronautics in Alaska, it may be said that the enterprises which have been developing there against extremely adverse conditions have passed the experimental stages and are beginning to get in shape to form a nucleus for further expansion when it becomes economical to exploit Alaskan resources on a larger scale. Though nothing is forseen to justify a sudden boom, it is evident that Alaskan industries are growing a little bit each year and nobody is complaining about industrial depression. The outlook for Alaskan airlines would therefore appear promising not only as a pioneer effort but as an established, steadily increasing business.

An emergency landing field on a sand bar of the Kuskerkwin River

Capital Investment

IN THE INDUSTRY

A Particularly Interesting Analysis of How Capital has Been Invested in Aeronautics and for What Purposes it has Been Expended

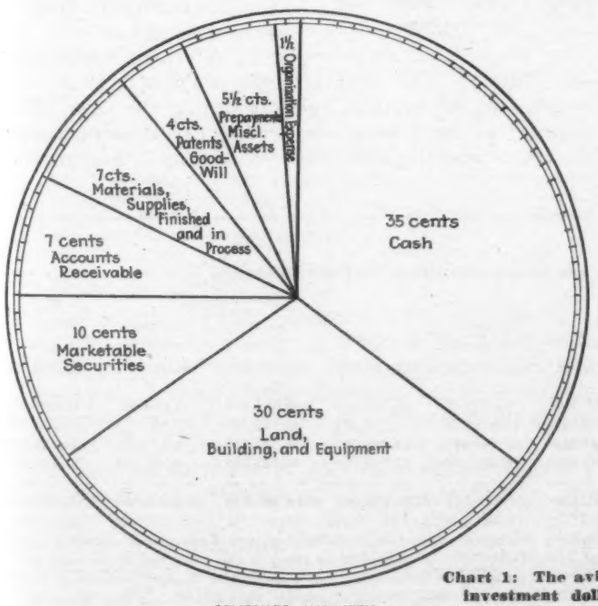
By ROBERT R. DOANE

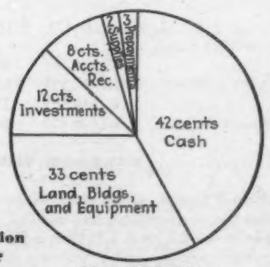
THE EXACT determination of the total investment in an industry at any given time is a difficult undertaking. It is difficult for many reasons; first, non-uniformity in methods of accounting presents a problem; second, the fact that all corporations do not issue public statements in any form; and third, if all statements were available and a uniform method of accounting were adopted there would still remain large differences of opinion as to those items that should be included in the estimate, as we have witnessed in the case of our railroad valuation problem.

Hence the necessity of being specific in a clear definition of exactly what it is we are setting out to find.

The total capital funds *invested in* an industry; the total capital funds *employed by* an industry; and the total capital represented as inherently a *part of* an industry are all different things and supply us with different totals. Thus there is at the outset a certain amount of confusion as to exactly what is meant by "total investment," as well as to what value it would be to us if we had agreed upon a definition and knew the exact amount.

In taking up the latter problem first it can be said that the advantage of seeing things whole is so obvious as to certainly not need a complete restatement here of the arguments in its defense. Suffice it to say that the problem of unbalanced production alone justifies our accurate knowledge of the resources at an industry's command. Further, such knowledge may serve to supply us with a set of standards or tests with which one branch of the aeronautical industry may be compared to another, as well as a measure of managerial efficiency


1½ Organization Expense
5½ cts. Prepayments Miscl. Assets
4 cts. Patents Good-Will
7 cts. Materials, Supplies, Finished and in Process
7 cents Accounts Receivable
10 cents Marketable Securities
35 cents Cash
30 cents Land, Building, and Equipment
COMBINED INDUSTRY



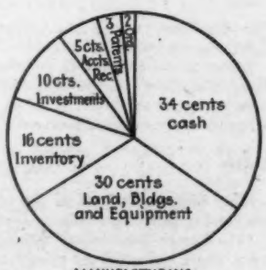


Chart 1: The aviation investment dollar

and individual corporate progress.

The capital of an industry consists of its individual corporate assets. Land, buildings, machinery, raw materials, unfinished and finished goods, investments, cash, accounts receivable, patents and all other forms of property owned by its individual participants, corporate partnership or otherwise, constitute its capital assets.

Since many of the assets of a concern may fluctuate more or less continually in value they are likely to be worth at any given time more or less than their original cost. Therefore many prefer to measure the total capital investment by this yardstick of varying values—total number of shares outstanding times current market quotations.

A less accurate but more commonly used method refers to capital investment as the total amount received from the sale of the corporate securities. This method eliminates the investment of new capital out of the profits of the business (surplus) and makes no provision for distinction between investment trusts, holding companies, merger stock issues, etc. Further, and of prime importance, the ultimate elimination of purely stock promotions, round which every industry is infested, cannot be readily accounted for.

Then there is the finer economic distinction of capital—not as funds—but as goods and services employed plus the annual value added to the raw materials utilized in the process. This would quite naturally give us a much larger sum than any of the above-mentioned methods, as it must include the value of all planes, parts and engines made in any year as well as the value of the total number of planes already in use in the nation.

And last—the actual investment in an industry—for all valid statistical purposes, consists of its capital liabilities which are its corporate ownership shares—plus surplus. Thus, literally, *capital investment* refers to the actual original *cost* of the assets of the various concerns plus what they have been able to save out of their operations.

It is this latter method that we have employed in this study, not only because it enjoys the approval of good banking statistical practice, and will thus be more likely to supply a more accurate picture of the actual current position of the industry, but that it also represents what the average individual of competent business experience has in mind when he employs the term "capital investment." However, in order to disappoint no one, all five estimates are given in Table II under their respective classifications.

Table II—Comparative Estimate Total Capital Employed in the Aircraft Industry

(Five year period; Dec., 31, 1924–1929)

Divisions	1925	1926	1927	1928	1929
Manufacturing	$26,000,000	$32,000,000	$72,946,350	$284,565,491	$337,759,935
Transport	.....	5,000,000	7,053,650	21,006,485	33,480,485
Total Capital Investment	**$26,000,000**	**$37,000,000**	**$80,000,000**	**$305,571,976**	**$371,240,420**
Airports	2,500,000	7,500,000	18,000,000	150,000,000	335,000,000
Sales financing companies	.....	.....	.....	5,750,000	11,500,000
Insurance	.....	500,000	2,000,000	6,850,000	13,705,808
Investment trusts	.....	.....	.....	9,877,600	55,652,600
Value of planes in service	10,525,200	14,460,000	22,680,000	56,248,000	67,137,000
Total Amount of Active Capital in Aviation	**$39,025,200**	**$59,460,000**	**$124,680,000**	**$534,297,576**	**$854,235,828**
New financing, accumulative	3,500,000	28,500,000	115,500,000	612,000,000	778,453,000
New financing, annually	3,500,000	25,000,000	87,000,000	496,500,000	166,453,000
Total corporate assets	28,575,000	40,885,000	86,190,000	337,657,033	410,291,429
Security market values	13,260,000	174,000,000	406,000,000	924,000,000	382,800,000

All of the above figures are as of the end of each calendar year.

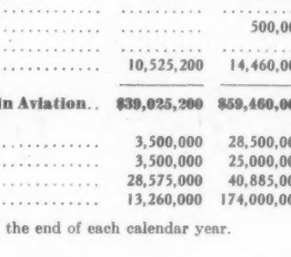


Chart 2: Capitalization-gross income ratio. Illustrating the widening spread between gross volume and capitalization

It has been estimated conservatively by the Aeronautical Chamber of Commerce of America that the beginning of 1928 saw approximately $100,000,000 invested in the aviation industry. The Standard Statistics Company of New York has estimated, from a careful analysis of new security offerings during the year, that at least $500,000,000 of new capital was attracted to the aviation industry during the year 1928, exclusive of large sums advanced to closed corporations by private banking interests. According to a statistical

Table I—Estimated Total Capital Investment in the Aircraft Industry in the United States

	Total Capital Investment[1]	Total Assets	Fixed Capital Investment	Cash	Current Assets	Current Liabilities	Net Working Capital
The "Big Four"*	$154,124,452	$171,676,202	$53,715,235	$47,109,820	$72,512,935	$6,506,332	$69,006,603
Companies whose securities are listed on the New York Stock Exchange and out of town exchanges	75,254,180	81,763,500	8,876,775	30,399,497	40,064,404	3,064,400	37,000,004
Companies whose securities are listed on the New York Curb	58,442,323	65,046,305	14,610,584	16,948,273	43,364,203	9,636,488	33,727,715
New York open market	21,340,895	23,423,518	3,893,396	14,542,363	16,394,358	1,725,721	14,668,637
Miscellaneous companies, local concerns, close corporations	62,078,570	68,381,904	16,219,198	21,799,990	35,067,180	4,186,588	30,880,592
Totals	**$371,240,420**	**$410,291,429**	**$97,315,188**	**$130,799,943**	**$210,403,080**	**$25,119,529**	**$185,283,551**

[1]This figure is obtained by the amounts charged against capital stock as on the liability side of the balance sheet of individual corporations, plus surplus.

*The Curtiss-Wright Corporation, the largest in this group, is a holding company whose assets consist mainly of stock in the various units of which it is comprised, while its liabilities consist almost entirely of capital stock. Its opening balance sheet carries this stock at the closing market prices as of August 14, 1929 at $219,531,880.13. The estimate as given in this table carries the capital investment as given on the liability side plus surplus of each corporation in the holding company. This method eliminates $151,696,785; a discrepancy which may account for a large part of previous over-estimates.

study made by Air Investors, Incorporated, offerings of securities by 82 aviation companies during the year ending Aug. 31, 1929, totaled $248,000,000. This last figure represents an over-lapping however, as it also includes financing during the last third of 1928 which has already been included in the Standard Statistics estimate for that year.

Emanating from presumably responsible quarters close to the industry there have been varying estimates placing the total sum anywhere between half a billion to a billion and a half dollars. The results of this study do not support such previous estimates.

However inadequate the meager available figures may be it is clear that the total investment in the entire aircraft industry as a going number of concerns has never exceeded *four-hundred-million dollars* and at present stands at considerably less than that amount. Obviously a large portion of the recent financing which included issues for the consummation of mergers and consolidations cannot in their entirety be added to this total, as this merely represents a re-financing or re-capitalization of existing fixed and earning assets through an exchange of stock certificates and does not include new capital investment in the strict sense of the term. Further, aviation insurance companies, aviation investment trusts, aviation sales financing companies cannot be added.

It has further been estimated that during the past eighteen months there has been over $300,000,000 invested in airports and landing fields in this country. This is exclusive of the military and naval figures. Of this amount that part invested by the industry itself could only come from funds already in hand and therefore this total cannot be added to swell the figure without duplication.

Also it should be noted that the current method of many specialists in this field, of determining the capital investment by the easy process of multiplying the total number of shares outstanding by the current market quotations, supplies a highly variable figure utterly bereft of practical meaning whatsoever. It has been borrowed.

Table III—Comparative Operating Ratios[1]

Classification	Gross Revenues	Total Capitalization	Operating Ratio Per Cen	Percentage of Gross Return to Total Capitalization
Aircraft Manufacturing	$14,739,750	$21,129,633	56	69.7
Air Transport.....	3,039,701	4,706,284	56	64.5
Other Industrials[2].....	227,744,000	274,470,000	90	81.0
Railroads[3].....	498,316,925	9,413,101,000	70	5.2

[1]Two representative manufacturing and transport companies have been selected for the purpose of this comparison.
[2]Includes General Electric, Westinghouse and Western Electric Companies
[3]Reporting railroads covering 241,695 miles.

inadvertently, from some financial writers of the daily press who seem to be able to impress the public with a technique utterly without rational application this side of paradise. It would seem, especially for the conservative interests of this industry, that a more guarded course could well be pursued. Such a procedure may be interesting as a measurement of pool manipulative efficiency coupled with the gullibility of a certain section of the investing public, but for any other practical purpose the writer fails to find validity.

Some writers have implied a deep concern for the investing public who have so liberally supplied (according to them) almost seven hundred millions of dollars to the industry during the past two years. Now let us see, out of this amount, just how much the investing public really has contributed. First, there is the sum of a round 86 million for investment trusts and finance companies to be deducted as not going direct to the industry; next the sum of 20 million for holding company financing; third, it must be kept in mind that the practice of individual corporations within the industry of making inter-company investments tends to dilute the invested dollar, this amounts to fully 15 per cent of the total. (When one corporation has sold its securities and out of the funds thus received and in turn invests in the stock of another aviation concern this stock is carried on the liability side of both balance sheets, although it represents money already belonging to the industry just the same as does the participation of the industry in the purchase and development of airports out of funds already in hand. As we have stated before, this clearly represents duplication and cannot be added again to the actual new capital investment.) Then there are the number of shares which are authorized and outstanding but which have been issued to the promotors of the undertaking and are carried on the asset side as

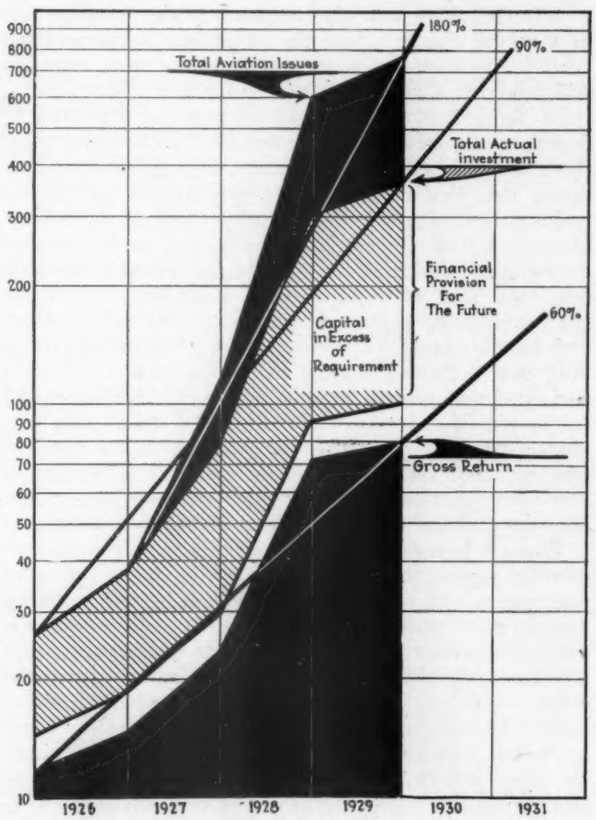


Chart 3: Rate of capital accumulation and utilization

Table IV

	Total Capitalization	Total Gross Volume of Business	Percentage of Gross to Total Capitalization and Surplus
1925.....	26,000,000	11,346,734	42.3
1926.....	37,000,000	14,711,685	39.7
1927.....	78,000,000	23,805,307	30.5
1928.....	305,571,976	72,659,469	23.8
1929.....	371,240,420	81,500,000	21.9

a deferred asset but also appear on the liability side as a capital charge. Also the investment house of issue receives its commission in large part in stock which it will hold for a while and later distribute. Such deductions figured at 5 per cent, certainly a conservative figure, would account for another 33.7 millions. Further there is that amount of which the issuing house or syndicate has been required to re-purchase as well as the undistributed supply still lying undigested on the dealers' shelves; a total amount safely estimated at 10 per cent of the total, which never reached the ultimate investor. The total sum of these various deductions amounts to the considerable portion in excess of 280 million which may be subtracted. Of course this is a continuous process with new securities coming on to the market, over the period of twenty-four months under examination, which are in turn (a portion of them) traded out for the previously partially distributed securities. On the whole it may be safely estimated that out of the total number of new offerings that part absorbed by the investing public does not stand at much more than 400 million dollars.

When it is realized that during this same twenty-four months' period the American investing public absorbed over twelve and one-half billion dollars in new corporate securities of railroads, public utilities and industrials; imported another two billion dollars in foreign securities; purchased five billion dollars in new building and real estate ventures, and employed some seventeen billion dollars in stock market speculation, that portion which went into aviation was, in reality, infinitesimally small. In other words, out of every dollar invested during this period just a fraction over one cent went into aviation. And yet the balance sheet of this industry today shows that they have conserved some four hundred and ten millions of dollars in assets. For this record it does not appear that aviation, as our youngest industry, need apologize.

According to the 1929 balance sheet the total assets of the industry aggregates $410,291,429. There are

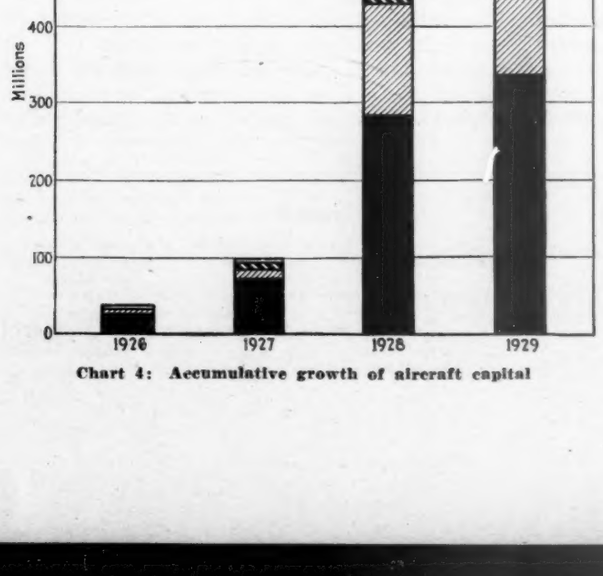


Chart 4: Accumulative growth of aircraft capital

1,105,804 shares of preferred stocks and 43,349,560 common shares outstanding. The total surplus stands at $29,051,009. Thus there is represented a total capital investment in the industry of $371,240,420.

The assets are distributed (see Chart 1) according to the following percentages:

Items	Per Cent
Investment in plants, machinery and real estate	30
Other investments	10
Cash	35
Inventories	7
Accounts receivable	7
Patents, good-will	4
Prepayments, miscellaneous	5½
Development and organization expense	1½
	100

Current assets thus are as follows:

	Per Cent of Total	Per Cent o Current Assets
Cash	35	68.2
Inventories	7	15.9
Accounts receivable	7	15.9
	49	100.0

Current assets per share of common stock thus amount to 49 per cent of $410,291,429, or an average amount of $47.58 per share. With the per common share value of plant standing at 30 per cent and investments at 10 per cent the theoretical book value stands as follows:

		Per Cent
Current assets	$201,042,800	49
Fixed assets	164,116,572	30
Investments	41,029,143	10
	$406,188,515	89
Total current liabilities	25,119,529	..
Net tangible assets	$381,068,986	

Thus it can be readily seen that on Dec. 31, 1929, with aviation securities selling at a market valuation of 382 million they were selling at exactly their book value and not discounting future earning power.

Having now a general idea of the bookkeeping position of the industry the next question might well be asked—"What is the probable future value of the investor's equity?"

When put on this basis such computations must essentially have no point unless relating to individual corporations. Here, again, the extremely meager information disclosed by many of the corporations offers only very general grounds for analysis. However, a fairly accurate approximation of the total annual gross return may be obtained, which, although it cannot be very helpful in answering the above question, may serve very well as a measure of the adequacy or inadequacy of the industry's total capitalization. These ratios are clearly indicated in the accompanying Table No. III. The total gross value of business does not include minor revenues from small operating companies, local taxi service concerns, etc.

One of the important standards or tests of efficiency in all lines of business is the percentage of total expense of running the business to gross sales. This is what is commonly known as the "operating ratio." The difference between gross revenue (100 per cent) and the operating ratio is the percentage of gross profit on the sales. The higher the operating ratio the lower will be this percentage of gross profit—a high operating ratio may mean that a slight variation in expense would prove

sufficient to transform a profit into a loss. On the other hand a *low* operating ratio—indicative of a business with substantial profits—is therefore subject to considerable competition.

It will be noticed in Table III that both the transport and manufacturing divisions of aviation show a phenomenally low operating ratio as compared with other branches of industry. A fact which is of outstanding significance to all those interested in the industry at this time. It should be noted that this ratio has been obtained by averaging the gross sales and operating expenditures of only the leading corporations in the industry and does not include the smaller and more recent independent units. This method must essentially be selected for its better ability to demonstrate aviation's possibilities.

Another interesting and enlightening comparison in the table will be found in the low percentage of gross return to total capitalization. This would indicate, on the basis of this showing for aviation, a clear overcapitalization. When we consider the small and highly favorable operating ratio compared to the rather low ratio of gross to capitalization it becomes clear that the business is a profitable one but that the profits have had to be spread out too thin. However, this does not take into account the financial management's plans for the ultimate improvement and growth in total volume of business.

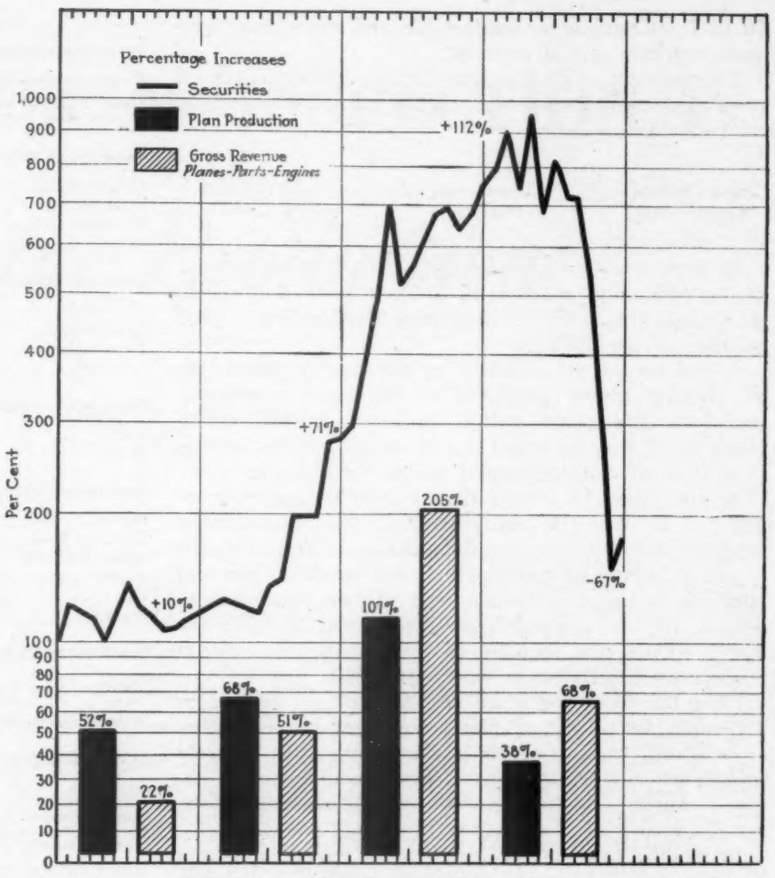


Chart 5: Market behavior of aircraft stocks

It is thus conceivable from this analysis that the large increase in output of late years coupled with the so-called unbalanced production of last year *has not been secured at the expense of the industry's provision for the future.*

The present plant equipment of the industry was augmented during 1928 and early 1929 to a producing capacity of what has been estimated at 20,000 planes per annum. That such a rapid plant expansion would be sound only if an economic demand existed, goes without saying. In early 1929 predictions for the year's output ranged from 12,000 to 19,000 planes, whereas any sound basis of prediction could not help but limit the total consumption of planes to a figure nearer 6,000 for the year. That these earmarks of over-expansion have proven no more costly to the industry than the year-end condition of its balance sheet now discloses speaks well of its management's ability to effect a rapid readjustment.

That portion of the entire sum of money now placed at the disposal of the aviation industry which is invested in raw materials, in stocks partly finished and in finished products, and in accounts receivable now stands at a sum less than 15 per cent of its total assets.

By adding to the above-named items the total marketable securities held, loans on call, Government bonds, and cash, we get the working capital of the industry as distinct from its fixed capital. This sum now stands at approximately $250,000,000; almost two-thirds of the entire investment in the industry. By subtracting from this amount the total current liabilities now standing at around $25,000,000 we get $225,000,000 as the total aggregate *net working capital* of the industry. A sum in excess of 50 per cent of the entire investment in the industry which is maintained in a liquid state, with an average ratio of current assets to current liabilities of

Table V—Total Number of Shares Outstanding in Aviation Industry

Classification	Preferred	Common	Total Shares All Classes
Preferred, (par value)	1,105,804	.....	1,105,804
Class "A" (no par value)	.....	2,459,246	2,459,246
Common, (par value)	.....	449,296	449,296
Common, (no par value)	.....	39,335,214	39,335,214
Totals	**1,105,804**	**42,243,756**	**43,349,560**

Table VI—Aviation Corporations Whose Securities are Actively Traded In the New York Market

Markets	1925	1926	1927	1928	1929
New York Stock Exchange	1	1	2	2	5
New York Curb Exchange	1	4	5	14	39
Open Market	8	8	18	32	39
Totals	**10**	**13**	**25**	**48**	**83**

Table VII—Average Annual Rate of Increase Past Five Years

Total New Aviation Capital Issues (Per Cent)	180
Capital Investment; Manufacturing and Transport (Per Cent)	90
Gross Volume of Business, Planes, Engines, Parts (Per Cent)	60

10 to 1. Certainly a comfortable and more than adequate working capital position.

The per cent of current liabilities to current assets, of current assets to total assets, and of current liabilities to total liabilities follows:

Current Liabilities to Current Assets	Current Assets to Total Assets	Current Liabilities to Total Liabilities
10	51	8

If there have been many instances of miscalculation in the estimation of demand it has not, in any visible sense, indicated itself as weakening the working capital position of the industry.

A full set of principles as to the proper proportion of working capital employed in the aircraft industry cannot be undertaken within the limits of this study. However, it may be stated that it must be clear that the proportion of working capital among the transport operating companies is greater than in that of manufacturing. Also that in manufacturing the conditioning elements naturally involve the volume of business, the length of period of manufacture, the terms of sale and purchase, seasonal variations, etc. When these factors become more or less stabilized then we can probably say that a 50 per cent increase in output will necessitate a proportionate increase in working capital.

From the foregoing it will be seen that not only from the standpoint of present plant equipment, but from that of working capital as well, the industry is entirely capable of supporting a far larger annual turnover before recourse to borrowing or additional financing will be necessary.

In looking upon any industry from an unbiased and impartial point of view we need a perspective in order to see clearly how it fits or can be made to fit into the mosiac of our industrial life. For this purpose Table IV has been included which supplies average comparative earning ratios for other important industrials outside the field of aviation. Also Table V has been included which may be of some assistance in ascertaining the relative sums of capital employed as well as the present relative economic position of the various major industries.

As long as there are changing perspectives within aviation there then must be a continual re-focusing if we are to keep the adjusting elements in clear definition. Especially is this true since large numbers of the public have, through investment, come into partnership with it.

At present the best available method this public has of measuring aviation's advance is through the market behavior of its securities. Barring abnormal speculative conditions these values fluctuate with earnings. Witness the comparative relationship as shown in Chart 5 between changes in percentage increases in output and gross earnings and market price trends. It appears from this study that the real inflation in aviation took place prior to 1929 and that as early as May of last year adjustments of considerable magnitude were under way.

As a result of this review of the industry's resources one thing is outstandingly clear—that aviation's advancement is not being retarded because of lack of funds. Like other divisions in the American industrial structure aviation has been able to take advantage of the unprecedented period of capital accumulation of recent years and attract to itself its proportionate share in abundance. So great has been this accumulation that a majority of the major companies—aside from being producing and transport units—are virtually investment trusts as well,

Table VIII—Wealth in the United States

Total steam railroads and accessories	**$30,360,880,000**
Commercial and office buildings	55,759,800,000
Urban houses, shops and hotels	48,480,400,000
Other urban real estate	51,000,000,000
Total Urban Real Estate	**$155,240,200,000**
Manufacturing, machinery and tools	45,500,000,000
Meat packing	450,000,000
Petroleum tankage	85,000,000
Petroleum pipe line	850,000,000
Total Manufacturing and Industrial	**$46,935,000,000**
Farm land	55,263,060,000
Farm buildings	12,433,060,000
Farm implements	4,478,880,000
Live stock	6,825,000,000
Total Agricultural	**$79,000,000,000**
Gold	4,324,350,000
Silver	844,149,000
Total Basic Monetary Stock	**$5,168,499,000**
Mines	**$4,300,000,000**
Light and Power	10,750,000,000
Electric railroads	5,500,000,000
Telephone and telegraph	2,550,000,000
Gas	1,750,000,000
Water	750,000,000
Total Public Utilities	**$21,300,000,000**
Canals	1,901,925,000
Ships	1,056,625,000
Wharves and docks	1,267,950,000
Total Water Transportation	**$4,226,500,000**
Irrigation	**$775,000,000**
Motor Vehicles	**$9,500,000,000**
Stock of Goods	**$64,159,601,000**
Aviation manufacturing and transport	371,240,420
Airports and services	415,858,408
Planes in service	67,137,000
Total Aviation	**$854,236,828**
Grand Total	**$421,719,916,828**

with large and diversified holdings in their portfolios representing a complete cross-section of American business enterprise.

With a cash and liquid position almost invulnerable—with able management entirely capable of conserving its position—with an ever-present alertness to the development possibilities of worthy technical advances and opportunities—it seems reasonable to expect these forces, which have contributed to its growth in the past, to continue in effect for the future—and with even more telling results.

An elemental characteristic of mankind is our delight in disciplining one another. Each time a business crisis arises there appears out of the void that inevitable reserve army of critics who pour forth their taunts at those enterprising men who are presumably so wont to blunder. These critics will take a segment of an industry which happens to be in the spotlight, analyze it down to the weakest point and then employ that point as a measure of the entire industry. This, of course, has its wholesome aspects, as such procedure serves as an inexpensive police or guard for the purpose of driving the undesirable promotion out of the field. But its results should not confuse the balanced mind on those outstanding elements within the industry that merit our more serious consideration.

ORGANIZATION OF INSPECTION IN *Airplane Production*

By ROBERT JOHNSON
Production Engineer, Boeing Airplane Company

Inspection in the airplane factory is one item of work about which the ultimate consumer may hear very little, but which in reality is one of the most important phases in the manufacture of his purchase. In this article Mr. Johnson writes of the inspection methods at the Boeing plant, and of the meticulous care taken to insure the same high grade of material and workmanship from drafting board to test flight.

DURING the past few years in aeronautical development, safety has been established as a characteristic of the airplane, and engineers have improved and refined aircraft to a degree of efficiency and dependability that has resulted in the application of the term "airworthy" to the approved type airplane. Engineers have established the margin of safety, but the responsibility of maintaining it throughout actual airplane manufacture rests with inspectors.

To sum up the duties of the inspection staff of an airplane manufacturing organization, it not only must oversee the production work so that the plans of the engineering personnel are carried out to the last detail, but it must also analyze the products of the plans, and reject any which may be inconsistent with the standards of safety and quality. At the plant with which the author is connected, at Seattle, inspectors continually supervise the fabrication of the many thousands of parts entering into the assemblage of a single plane, and none of these parts may be used without the unqualified approval of the inspection staff. In short, the inspector protects the quality of the airplane throughout its entire construction.

We take it as fundamental that the inspection depart-

Inspectors at work checking a consignment of square duralumin drawn from round stock in the Boeing machine shop

ment should be organized as a separate, self-contained unit responsible only to the management of the factory. This type of organization has been established, in spite of the necessarily close alliance of inspectors with the engineering department, in order to insure impersonal and unbiased evaluation of products.

THE INSPECTION STAFF includes 30 highly trained men, who are responsible for the conduct of inspection in every department of the production organization of the factory. John Wilson, who has been associated with the company since May, 1917, is chief inspector in charge of all company inspection. The assistant chief inspector is W. J. Tynan, also with many years of experience in airplane manufacture and inspection.

The responsibility of the inspection department commences with the receipt of raw materials at the factory, and ceases only with the final acceptance and shipping of the finished planes. When raw materials are received, they are first submitted for inspection. Generally, this consists of a check for quality, quantity and dimension against the corresponding purchase order and billing.

If the material is of the type which requires a chemical test for composition or physical tests for strength, dependent upon the requirements of the contract for which the material will be used, the inspector places the material under bond in the warehouse and samples are prepared for testing. Tests are conducted by the test engineer, who, although affiliated with the engineering department, is closely allied with the inspection staff. If the tests are satisfactory, the material is properly color marked, to designate the kind of material, and transferred to the stock room to be stored until it is required for fabrication. In case the tests are unsatisfactory, the material is rejected and returned to the source of supply, with explanation of the cause for the rejection.

Lumber is inspected at the source of supply by company inspectors, and purchased on their recommendation. Parts produced in the machine shop are routed through the metal inspection booth, where they are accepted or rejected by the inspectors. Parts are inspected for material, dimensional accuracy and quality of workmanship.

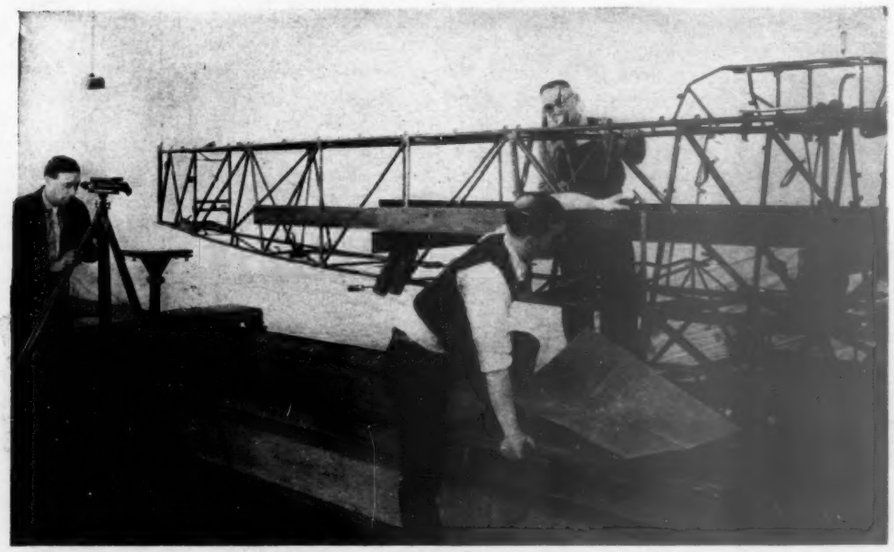
Making a final inspection of a 16 passenger, tri-engined transport

Inspection is conducted with detailed drawings, which are submitted with the corresponding products. The finest type of instruments are used by the inspectors for measuring and other forms of inspection, to preclude the possibility of parts deviating even slightly from the dimensional requirements.

STEEL PARTS are heat-treated in electric furnaces for strengthening, and inspection in this department not only includes examination of finished parts but also regular checking of furnace temperatures to insure correct heat treatment. Test pieces are included with each consignment of parts under treatment, and these are referred to the test engineer.

In cases where parts are fabricated from flat stock, as in the sheet metal department of the plant, a template and one part are produced and submitted to the inspector for his approval. If correct, the template is accepted and production is started.

In most cases during the fabrication of a part, several operations, necessitating work in various departments of the plant, are required before it is completed. After each individual operation, the part is carefully inspected before it is transferred to the next department. The result of the inspector's examination is indicated on the



Steel frame fuselage undergoing a general alignment inspection at the Boeing plant

shop order, which thus forms a complete record of the inspection of a part during its fabrication.

In the assembly of structural units, such as the fuselage, wing frames or other members of the airplane, where a jig is employed, the latter is closely checked by inspectors before assemblage is commenced. When the jig is approved, the welding department assembles the component parts, which have been examined and approved. After the fuselage is completely assembled and cleaned, it is placed on a permanent steel alignment jig for a final inspection conducted with precision instruments for alignment checking.

Such careful methods are carried out in the inspection work in the other production departments of the factory. Divisions of the inspection department are maintained in the receiving store, the machine shop, the sheet metal department, the wing assembly department, the brazing and welding department, the wood-working department, the hull department, the plating and enameling department, the fabric and dope rooms, the sub-assembly department, the final assembly department, the shipping department and the hangar at the testing field.

In the inspection of cloth, for example, the number of threads to the square inch must be exactly checked. When the fabric is applied to the wing frames, fuselages or tail structures, inspectors must make certain that the sewing conforms to military requirements. Stitches and knots must be checked for correctness and number, as well as for size. During the doping, inspectors must oversee the application of the dope so that the specified number of coats are applied, and that the application and treatment are correct. Water rubbing with a fine sandpaper is conducted to insure a smooth surface, and inspectors must supervise this to guard against injury to the fabric. Color dope is an effective preventative measure against injury to the cloth, for the rubbing is stopped as soon as the color starts to whiten, or thin.

IN THE CASE of closed steel tubular structural members, such as the fuselage, the interior of the tubing is protected by a coating of oil. Linseed oil is heated to a high temperature and forced into the tubing through a special port. The inspector can check the progress of the oil through the tubing by touch, for the hot oil heats the tubing, and when a part of the structure is cold, the inspector knows that something inside the tube is blocking progress. When the framework is entirely oiled and subsequently drained, the ports are sealed and then a red oxide primer is applied and the entire structure is placed in a huge electric oven to be baked. Coats of enamel are later applied and also baked, and the inspector must check the oven temperatures during this process. Open tubular work is protected by an interior coating of red oxide primer.

When the parts are completed and accepted by the inspectors, and following the completion of sub-assembly and the subsequent inspection, work is begun on the final assemblage of the airplane. The inspection in this department is extremely detailed. A department inspector and four sub-inspectors are engaged in conducting the inspection in the final assembly department. Every detail of the plane is checked. When the inspectors are satisfied that the plane fulfills all requirements, a tag is affixed to it signifying that it is completed, approved and ready for release to the test field. Inspection does not terminate, however, with the completion of final assembly. Before the airplane is flight tested, the field inspectors of the organization conduct a final detail inspection. Instruments and engines are thoroughly tested and every part and every connection is inspected. In engine installation inspection alone there is a report including 54 items that must be checked.

TO ELIMINATE the possibility of any unsatisfactory part entering into the construction of an airplane, a complete system of identification and classification of parts by prominently displayed tags and stamping and numbering of parts is maintained by the inspection staff. The tags are prepared for accepted parts, rejected parts, parts requiring further work, parts requiring repair work, parts accepted for heat teatment and completed planes released from the factory. The tags are affixed to conspicuous places on the parts to prevent any miscarriage in their handling.

Inspectors checking a wing section for alignment

In the case of a rejected part, it is generally consigned to the scrap room, and it cannot be used in the assemblage of any plane. Often the inspector is in some doubt as to the acceptibility of a part, and in such case it is routed to the salvage department where it is stored for possible use or reworking, only after it has been examined by the salvage committee. This committee is composed of the Chief Inspector, the Chief Engineer, the Superintendent and one member representing the purchaser.

The company inspection system at the Boeing plant is closely allied to Army and Navy inspection requirements, and Department of Commerce specifications are adhered to also.

Inspection staffs are maintained, at any factory where military and naval work is done, by both the Army and Navy for the purpose of examining the manufacture of military aircraft. Parts for Army and Navy planes must be designed and constructed according to military requirements and specifications. These parts are referred to the Army or Navy inspectors for their approval and acceptance only after the company's own inspectors have approved them.

EXHIBITS AND *Salesmanship*

Some Timely Suggestions Regarding the Layout of Showrooms and Selling the Prospect

By JOHN A. ROSE
Parks Air College, Inc.

AIRCRAFT SELLING should be, literally, on as "high a plane" as that of any other line of legitimate merchandise. To be successful in selling airplanes, salesmen need ready understanding, tact, ability and courtesy as well as loyalty and enthusiasm. No matter how good and self-selling an article is, the real salesman learns all there is to know about it, so that he can readily and correctly answer questions and thus put strength into his selling.

Too many planes should not be crowded into display space. It is better to exhibit one or two to advantage. There is such a thing as "Eye Appeal" about a plane, so make the most of it. The airplanes in the display space should be so arranged as to invite people to stop and inspect them. A crowd draws a crowd, and the more people you can get to talking favorably about your exhibit and products, the more results you will get.

The decorative scheme of the salesroom or display space ought to be of cheerful neutral tones, preferable of a light tone, to set off the planes to advantage. Nothing is more depressing than a poorly lighted, crudely decorated sales room or display space. There is usually not enough attention paid to these matter. Take a lesson from the display windows of some of the high grade department and furniture stores and motor show rooms.

A small table should be at the back of the sales room or display space, and a few, but only a few, catalogs or booklets on it. It is not a good plan to hand out literature indiscriminately. It is better when an inquirer asks for a catalog, to tell him that you will get one for him, but that as it is rather bulky, you will be glad to mail it to him. If this suggestion is made in the right way, it invariably causes the inquirer or prospect to give his name and address which he might hesitate to do were he bluntly asked for them. People have been annoyed by so many "high-pressure" salesmen that they are chary about giving their names.

Salesmen should not post themselves immediately inside the door or entrance, but remain in the background. When visitors enter, they must be given time to get comfortably within the place, after which they can be tactfully approached—not rushed at. Instead of asking "are you interested in airplanes?" it should be taken for granted that the visitor is interested.

Salesmen should quickly note what the visitor may be looking at on the planes, or what he seems to be interested in. Possibly he is noticing the cockpit or cabin trimming, the struts, propeller, instruments, etc.; then the salesman can start right there and pointing to the spot, say something appropriate regarding it, and immediately start talking about the plane and its various other features, mentioning its advantages in such a manner that when the visitor sees and compares other planes, he will recognize the advantages of certain types.

When visitors come in, they should be given courteous and real attention, regardless of whether or not they may be located in the territory covered by some other dealer or salesman. The salesman should begin to get visitors interested in the various planes on exhibition, then after a time he can tactfully discover their business and residence locations, and if it is not within his own selling territory, he can get hold of the proper dealer or salesman, make the introduction and turn the party over.

SALESMEN should keep firmly in mind the fact that the exhibit is for the purpose of showing merchandise and obtaining business. And that Show Week is the time and place to get names and addresses of enough real prospects to enable them to close many satisfactory deals during at least the next three months.

Particular care should be given to salesmen's attire. Clothes should be clean and recently pressed, shoes polished and not run down at the heel. Shirts, collars and ties should be spotless. Each salesman should be clean shaven with hair neatly trimmed and brushed. Appearance counts for a great deal these days, far more than ever before. By appearance we mean not only the salesmen, but the planes, merchandise, salesroom or exhibit space, which should be kept spick and span.

Salesroom or booth should not be left at any time without at least one salesman in attendance. Sometimes during a dull hour is just when the best prospects are apt to show up. The luncheon and dinner hours can be arranged so that all the salesmen will not be away at the same time.

Salesmen should study their own merchandise carefully so they will be thoroughly familiar with the goods and be able to answer intelligent questions intelligently. Nothing is so disconcerting to a prospective customer as to ask a question and have the salesman flounder around and then come out with an answer that is evasive or is incorrect or guesswork.

GENERAL NEWS

HERBERT F. POWELL, *News Editor*

HIGH POINTS in the NEWS

▶ *"War."* Army Air Corps closes its tactical maneuvers in California. Among the high points: five demonstrations and inspections, the "defense" of San Francisco, night flights in formation, radio, photographic, and mechanical pilot tests, high altitude maneuvers.

▶ *Camden has one.* Pennsylvania, New Jersey, and Delaware stage the Tri-State Aircraft Show in Camden, N. J., April 18-26, with nineteen planes on display. Loyal D. Odhner managed the affair.

▶ *Five may band.* Officials of the American Eagle Aircraft Corp., Lincoln Aircraft Co., Light Manufacturing & Foundry Co., Szekely Aircraft & Engine Co. and Golden Eagle Aircraft Corp. are considering merger plans.

▶ *Going up.* Exports of aircraft, engines, and accessories for March show upward trend compared with February.

▶ *Wright change.* Guy W. Vaughn is elected head of Wright Aeronautical Corp. to succeed Charles L. Lawrance, who will devote more time to engineering and research work for the Curtiss-Wright firms.

▶ *What kept engines running.* Aeronautics Branch estimates 20,576,468 gal. of fuel and 1,028,823 gal. of oil were consumed in civil and commercial planes last year.

▶ *At London.* Adherents to London Naval Treaty decide no aircraft carrier of 10,000 tons (10,160 metric tons) or less standard displacement mounting a gun of 6.1 in. (155 mm.) shall be constructed by the contracting parties.

▶ *The Battle of New York.* Some seventy Army and Navy planes will stage sham battles over New York City during the New York Aircraft Salon.

Airports and Airlines

▶ *Struggle over.* U. A. & T. secures control of National Air Transport. Frederick B. Rentschler is elected president of N.A.T. and chairman of the board, replacing C. M. Keys and Howard E. Coffin, respectively.

▶ *Up to the President.* With Hoover's signature the Watres air mail bill will become a law as it has been passed by both the House and Senate.

▶ *Fire.* The Bureau of Standards is conducting tests on the efficiency of hangar sprinklers in coping with fires.

Coburn Now Heads Fairchild

NEW YORK (N. Y.)—As we go to press, word is received that Carl S. Reed has resigned as president of the Fairchild Aviation Corp. Frederic G. Coburn, who has just been named president of The Aviation Corp. of which Fairchild is a subsidiary, now becomes president of Fairchild and thus will fill both positions. Mr. Reed became president of Fairchild last September, having replaced Sherman Fairchild at the time the latter became chairman of the board.

Washington Officials View Navy Air Tactics

NORFOLK (VA.)—Navy fliers staged a series of maneuvers recently off the Virginia coast for Congressmen and military officials. Sixty-nine planes took part in the tactics and were flown off the plane carrier "Lexington" at ten-second intervals.

The sham battle included an "attack" on the aircraft carrier, which responded with its anti-craft armament, secondary and machine gun batteries. Another phase of the proceedings centered around the "attack" by single-seaters of torpedo planes approaching their objective under cover of smoke screens.

For three hours the aerial program was staged for a group which included Senator Hiram Bingham, president of the National Aeronautic Association; David S. Ingalls, Assistant Secretary of the Navy for Aeronautics; Clarence M. Young, Assistant Secretary of Commerce for Aeronautics; and members of the Senate and House Naval Affairs and Appropriations Committees.

Lieut. Marion Huggins (left) and Elmer Sperry shown with the units of the mechanical pilot, developed by the latter, which was used successfully in automatically flying a Curtiss Condor bomber during the Army Air Corps maneuvers. Note the compactness of the gyroscopic device.

Army Maneuvers On Coast Completed

26-Day Air Sham Battle Achievements Reviewed

LOS ANGELES (CALIF.) — Spectacular formation flying, aerial dog fights, and an aerial review staged at United Airport, April 26, marked the close of the 1930 U. S. Army Air Corps maneuvers, held from Mather Field, Sacramento, April 1-25. During the entire four weeks training period not a shot was fired or a bomb dropped, the maneuvers being directed at the perfection of coordinated flying tactics, rather than on target practice. No casualties marred the 26 day war, although one emergency parachute jump was recorded when Lieut. I. A. Woodring, last survivor of the Army's "Three Musketeers" of the 1928 National Air Races, leaped from a disabled pursuit plane. Mather Field, Sacramento, with a perfectly level landing area one mile square, and surrounded by hundreds of square miles of flat farming country, proved an ideal flying base. An important aviation training center during the War, the field offered excellent accommodations. Located approximately 100 mi. east of San Francisco, Mather Field is strategetically situated with relation to all traffic center of California, whether rail, highway, or water, and is an ideal location from which to attack or defend these points from the air.

Defense of San Francisco Is Climax

For purposes of the 1930 maneuvers a state of war was assumed, in which Los Angeles and all Southern California almost as far north as San Francisco was in the hands of an invading army. The major problems were to harass the advancing troops from the air by destroying travel and communication centers, in order to delay the advance of the hostile army until supporting troops could be brought from the East for the defense of San Francisco. The maneuvers were climaxed by an aerial defense of San Francisco against an attacking enemy fleet presumed to be attempting to force the Golden Gate. Throughout the maneuvers, the air forces were assumed to be acting as an independent fighting wing, unsupported by organized ground troops. After the entire Wing had flown to Los Angeles for the April 26 review and exhibition the various units dispersed to their several home stations throughout the U.S.

Actually, of course, the simulated war condition was merely used as a means of supplying objectives for the various

(*Continued on Page* 910)

Curtis Publishing Co. Issues Aero Survey Data

PHILADELPHIA (PA.)—Following a six-month survey of the United States by air, Charles Coolidge Parlin, manager of the division of commercial research of the Curtis Publishing Co., has written the results of his trip in a 176-page book called "The Aviation Industry." This 20,387-mi. trip was covered by the Curtis company Ford plane in 207 hr. of flying time under the pilotage of A. W. Gorton, Curtis pilot.

Says Mr. Parlin: "It seems to us likely that ultimately all first-class mail will be carried by airplane wherever an airplane can speed delivery; that a majority of 'Pullman class' day travel for distances in excess of 100 mi. will be by air; that air package transport may exceed first-class mail and passengers combined." He considers air express "one of the largest, perhaps the largest, potential for profit in the aviation industry."

Hindrances Listed

Consummation of aviation's extensive program will depend upon the following three factors, declares the writer: first, support by national and local governments with mail contracts, weather service, radio, lighting, and airports; second, the willingness of capital to make consequential investments in the industry; third, the amount and character of the advertising put behind the industry.

Mr. Parlin advances the prognostication that, within ten years fewer than ten companies, manufacturing less than twenty makes of planes, will produce more than 90 per cent of the total number of craft.

The report lists noise, wind and dust at airports, rough air, vibration, unpleasant airport buildings, difficulty in reaching airports, lack of room in plane cabins, and dirty cabins as hindrances to flying enjoyment which must be eliminated or reduced.

Cited among the deficiences occurring in the airport end of aviation in this country are the lack of good lighting, poor runways and drainage, lack of adequate service and, in many cases, insufficient acreage.

Markets Discussed

Two potential plane markets are believed by Mr. Parlin to be found in women and farmers. The former are expected to become a determining factor in the purchase of private planes, and also in the development of more comfortable and more pleasingly decorated transport craft.

Just as the motor car has done away with the isolation of farmers, planes will bring them within even closer touch of urban centers. Also, as a rule, farmers have room for landing fields, and hangars.

Appended to the survey are the results of two mail questionnaires. The first was sent to all listed owners of planes and 1,189 replies were received, 565 of them "commercial" and 624 "non-commercial." The second was sent to 1,000 students in aviation schools and 253 replies were received.

To the question, "What would you consider ideal for your purpose if you could have a plane built just to suit you?" the epitome of answers from both owners and students was: "A three or four-place cabin monoplane, with dual controls and a single 150-300 hp. engine, having a cruising speed of 95-100 m.p.h., but capable of 125-130 m.p.h."

The replies show that more than 40 per cent of non-commercial owners and a majority of commercial owners and students have incomes of less than $5,000, while more than 30 per cent of the non-commercial owners have incomes in excess of $10,000.

The age of the majority of non-commercial owners is more than 30 yr., and more than 14 per cent are over 40, while 67 per cent of the lower income groups combined is under 30 yr. of age. About 60 per cent of the owners and 40 per cent of the students are married. More than one-fourth of the students are college graduates and half are high school graduates or the equivalent.

More than 90 per cent of the owners fly their planes, and a majority use their planes less than 300 hr. annually.

Calibrating the Barograph Used by Elinor Smith

THIS IS THE WAY the Bureau of Standards, at Washington, calibrates a barograph to determine the actual height reached in record altitude attempts. Mr. Henrickson, of the Bureau, is shown checking the instrument recently used by Miss Elinor Smith in her flight to the record height (for women) of 27,418 ft. over Roosevelt Field, L. I. The conditions affecting the barograph in the flight are simulated by reducing the pressure and temperature within the bell jar. The instrument is then checked against the mercurial barometer, with the indicated altitude at the greatest height of the flight being compared with the mercury column to ascertain the degree of deviation.

Wings, Inc., Acquires Dungan

CLEVELAND (OHIO)—Dungan Airways, Inc., which operates a flying school from which 226 students have been graduated since 1928, has been taken over as a subsidiary by Wings, Inc., newly-formed $150,000 air firm. Activities of the Dungan concern will be expanded.

MacKenzie and American Merge

PORTLAND (ORE.) — Merger of the MacKenzie-Morrow Aviation Co., of Portland, with the American Aircraft Company, Ltd., of Los Angeles, is announced. The Portland concern will continue to operate its aviation school at Swan Island Airport under its present name and will act as distributor of American Eagle planes. Heading the new company as president is Arthur B. MacKenzie. Other directors are Tom Trebell, vice-president; George D. Strado, secretary; W. E. Rice, treasurer; Merle F. Kelly, chief pilot; and Jack Morrow, in charge of the Portland office.

Navy Orders Richfield Gas

NEW YORK (N. Y.) — Richfield Oil Corporation of New York, a subsidiary of the Richfield Oil Company of Calif., has received an order from the United States Navy Department for 1,892,000 gal. of gasoline, to be delivered immediately.

Many Subjects Listed For Dayton Aero Meeting

DAYTON (OHIO)—The complete program of the Fourth National Technical Aeronautic Meeting to be held here May 19-22 under the auspices of the American Society of Mechanical Engineers has been announced as follows:

Monday, May 19

10:30 a.m. Opening session, Hotel Dayton-Biltmore ballroom:
"What the Airplane Can Do in Central and South America," Roy Wright, managing editor, Simmons-Boardman Publishing Co., New York, N. Y.
"Economic Aspects of the Rigid Airship," by Carl B. Fritsche, president, Aircraft Development Corp., Detroit, Mich.

2:00 p.m. Airplane Production Symposium, Wright Field auditorium:
"Airplane Design, Manufacture, and Sales—Commercial vs. Military, Rex B. Beisel, chief engineer, Spartan Aircraft Co., Tulsa, Okla.
"Design of Airplane from Point of View of Cheap Production," Russell F. Hardy, chief engineer, Waco Aircraft Co., Troy, Ohio.
"Reduction of Airplane-Production Costs," J. Don Alexander, president, Alexander Industries Corp., Colorado Springs, Colo.
"Production Methods in Airplane Construction," R. S. Damon, airplane manufacturing engineer, Curtis-Wright Corp., New York, N. Y.

8:00 p.m. Special meeting of general interest in Dayton Engineers Club:

Tuesday, May 20

9:30 a.m. Airplane Design Session, Hotel Dayton-Biltmore.
"German Metal-Airplane Construction," Prof. Herbert Wagner, Technische Hochschule, Danzig, Germany.
"Airplane Wing Trussing," Richard Mock, Heinkel Flugzenwerke, Warnemund, Germany.
"Engineering Organization in Airplane Factory," E. Molloy, executive engineer, Keystone Aircraft Corp., Bristol, Pa.
"The Design of Giant Flying Boats, by Dr. Claude Dornier, Friedrichshafen, Germany.

2:00 p.m. Fuel and Lubricants Sessions, Wright Field auditorium:
"The High-Performance Gasoline Aircraft Engine and Its Fuel and Oil Problems," S. D. Heron, Wright Field, Power Plant Branch, Dayton, Ohio.
"Importance of Oiliness in Aircraft Lubrication," B. E. Sibley, chief engineer, Continental Oil Co., Denver, Colo.
"Present Status of Superchargers for Aviation Engines," Dr. S. A. Moss, Thomson Research Laboratories, General Electric Co., West Lynn, Mass.

2:00 p.m. Aerodynamics Session, Wright Field, Materials building:
"Practical Airplane Performance Calculation," Dr. Michael Watter, Chance Vought Corp., Long Island City, N. Y.
"Control at Low Speeds," Carl B. Harper, Lieutenant, U. S. N. Bureau of Aeronautics, Navy Department:
"The Airscrew With Minimum Loss of Energy," Prof. Enrico Pistolesi, R. Scolad'ingegneria, Pisa, Italy.
"The Application of the Boundary Layer Theory to Engineering and Aeronautics," Peter Thurston, London, Eng.

8:00 p.m. Special meeting at Dayton Engineers Club.

Wednesday, May 21

9:30 a.m. General Session, Hotel Dayton-Biltmore Ballroom:
"Silencing the Airplane," Hugh L. Dryden, chief, Aerodynamical Physics Section, Department of Commerce, Washington, D. C.
"The General Problem of Fire Hazard in Aircraft," C. G. McCord, Lieutenant Commander, U. S. Naval Aircraft Factory, Navy Yard, Philadelphia, Pa.

2:00 p.m. Materials Session, Wright Field auditorium:
"Some Characteristics of Light Alloys for Aeronautics," Dr. G. H. Gillett, Battelle Memorial Institute, Columbus, Ohio.
"Aluminum Alloys for Pistons and Air-cooled Cylinder Heads for Aircraft Engines," A. J. Lyon, First Lieutenant, Air Corps, Wright Field, Dayton, Ohio.

7:00 p.m. National Aeronautical Dinner, Hotel Dayton-Biltmore.

Thursday, May 22

10:00 a.m. Air Transport Session, hotel ballroom:
"Progress in Altitude Instruments for Blind Flying," Elmer A. Sperry, Jr., Sperry Gyroscope Co., Inc., Brooklyn, N. Y.
"The Economics of Airplane Transportation," Capt. Erich Offermann, Berlin, Germany.
"Principles and Developments of Air Law (by title)," Prof. Andre Henry-Couannier, Director of Air Law, Per Orben, Société Anonyme d' Editions, Paris, France.

2:00 p.m. Aircraft Engines Session, Wright Field auditorium:
"Trend in Aircraft Developments," Harold Caminez, Aircraft Engine Division, Allison Engineering Co., Indianapolis, Ind.
"Vibration Characteristics of Aircraft Engine Crankshafts," Prof. F. L. Prescott, Wright Field, Dayton, Ohio.
"Installation of Aircooled Radial Engines," P. B. Taylor, acting chief engineer, Wright Aeronautical Corp.

Ohio Air Law Meeting Called

COLUMBUS (OHIO)—John M. Vorys, state director of aeronautics, has called a conference of county sheriffs and prosecuting attorneys of Ohio to meet here May 7 in order to discuss enforcement of laws governing aviation. The conference will deal particularly with enforcement of laws relating to licensing of aircraft and pilots and the administration of regulations authorized by the last legislature. Speakers will include Mr. Vorys, Governor Cooper, Attorney General Bettman, and J. S. Marriott, of the Aero Branch. Officials will be given an opportunity to make airplane flights.

Tests Automatic Chute Release

VALLEY STREAM (L. I., N. Y.)—To test a new device designed to open a parachute automatically, John Runger jumped from a plane here April 27 with his hands tied behind his back. The chute opened nicely, but Runger landed in a tree near the field. Through use of a box and cord arrangement, Runger's parachute was released automatically when he had fallen a short distance, the chute release ring having remained with the plane. The apparatus, it is thought, will have a practical use for passenger planes in which those unversed in the use of the parachute fly.

[Somehow we think that the feat of dropping from a plane with hands tied behind one's back deserves special attention under the heading, "How Not to Promote Aviation." We think so regardless of how infallible the device may have been, and we think so even considering the fact that the bindings were arranged, as we understand, for emergency breakage.—Ed.]

Aero Branch Figures Gas and Oil Consumption

NEW YORK (N. Y.)—Estimates compiled by the Aeronautics Branch on fuel and oil employed by commercial and civil aircraft from 1926-1930 are 38,811,954 gal. of fuel and 1,941,098 gal. of oil.

More than half, or 20,576,468 gal. of gasoline were used during 1929, continues the report, while 1,028,823 gal. of the four-year oil total was absorbed last year.

An estimated consumption of 16,176,468 gal. of fuel and 808,823 gal. of oil were credited to miscellaneous operations—student instruction, aerial photography, private flying, sight-seeing, nonscheduled commercial flights, crop dusting, and experimental flying—last year.

Regularly scheduled mail, passenger, and express planes in 1929 "burned up" approximately 4,400,000 gal. of gasoline and 220,000 gal. of oil. The growth in the number of gallons of oil and fuel used for airplanes during the past four years is shown as follows:

Gasoline — Approximately 3,300,000 gal. in 1926, 5,060,000 in 1927, 9,900,000 in 1928, and 20,576,468 in 1929.

Engine oil — Approximately 165,000 gal. in 1926, 253,000 in 1927, 495,000 in 1928, and 1,028,823 in 1929.

A saving of approximately $500,000 a year is effected by the aviation industry due to the action of 32 states and the District of Columbia in either exempting aviation fuel from taxation or refunding the excise.

So declares the Air Travel Division of the American Automobile Association following a study based on the consumption of 20,576,468 gal. last year, and an average gasoline tax rate for the country of .0322 cents per gallon.

It was pointed out that the heaviest aircraft operations in 1929 occurred in states which are tax-exempt or refund the surcharge.

The states which do not provide for an exemption or refund are: Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, Nebraska, New Jersey, New Mexico, Oklahoma, Pennsylvania, South Carolina, Tennessee, Utah, and Vermont.

Seattle Air Week Observed

SEATTLE (WASH.)—Capt. John A. Macready, Tex Rankin, and Emory B. Bronte were among the well known fliers who took part recently in this city's Air Week celebration, April 21-27. The affair was sanctioned by the National Aeronautic Association and managed by Valentine Gephart. Some forty planes participated.

Floyd Smith Forms Chute Firm

BUFFALO (N. Y.)—The Floyd Smith Safety Chute Co., this city, has been formed by Floyd Smith. The office of the company is located at 528 Genesee Building.

Army Coast Maneuvers Are Completed

(*Continued from Page 907*)

squadrons, and much of the time was devoted to practise formation flying, and to aerial reviews and exhibitions. This was the first time that all branches of the Army Air Corps have been brought together for coordinated training and it proved an invaluable opportunity to test the relative efficiency of pursuit, attack, observation, and bombing units when supporting each other in battle maneuvers. With approximately 150 planes, 240 officers, and 350 enlisted men taking part in the exercises under the command of Brig. Gen. William E. Gillmore, as Commander in Chief of the First Provisional Wing, the complete training period included five aerial demonstrations, inspections and reviews; the dedication of two airports; a mass flight in defense of San Francisco; and three night formation flights, in addition to the regular training schedule and a series of special flights in connection with radio, photography, gyroscopically controlled flight, and other experiments.

Fly Long Distances

Participating squadrons set up new records for long distance cross country flights of Army air force units. The First Pursuit Group, Selfridge Field, Mich., commanded by Maj. Ralph Royce, made a round trip journey of 4300 mi. with 40 pursuit planes and four cargo planes. The Second Bombardment Group, commanded by Maj. Hugh J. Knerr, Langley Field, Va., negotiated a round trip flight of 5800 mi. with nineteen bombers and one cargo plane. The Third Attack Group, commanded by Maj. Davenport Johnson, Fort Crockett, Tex., flew a round trip of 3600 mi. with 28 attack and one cargo plane. The Seventh Bombardment Group, commanded by Maj. Carl Spatz, Rockwell Field, San Diego, flew approximately 1000 mi. round trip with twenty pursuit planes, four bombers,, and two cargo planes, while the Ninety-First Observation Squadron, commanded by Capt. Walter H. Kraus, Crissey Field, San Francisco, had only 95 mi. to fly each way with seven observation planes and one transport. Thus the total plane mileage travelling to and from the maneuvers alone, exceeded 437,000 mi., all of which was flown without serious accident or delay.

Types of Craft Employed

Planes participating in the maneuvers included the Curtiss "Hawk" P-1-B pursuit plane powered with a Curtiss D-12 430 hp. engine, the Boeing P-12 pursuit plane powered with the Pratt & Whitney 420 hp. Wasp, Douglas O-2-H observation plane powered with 420 hp. Liberty engine, Curtiss Falcon A-3 attack planes powered with the Curtiss D-12 430 hp. engine, Keystone L-B-7 light bomber powered with two Pratt & Whitney Hornet engines of 525 hp. each and carrying a load of 2,000 lb. of bombs, and the Curtiss Condor B-2 bomber powered with two Curtiss GV-1570 engines of 600 hp. each and carrying a bomb load totalling 4,000 lb.

Particular importance is attached to the fact that this is the first time that a large air force has successfully operated for an extended period of time entirely independent of surface supply systems. All supplies, including a number of complete engines in their crates, were carried to the field in the nine tri-engined Ford and Fokker transport planes which were kept in constant service for the entire period of the maneuvers and a considerable time before. In the case of two forced landings due to engine trouble which occurred during the exercises, entire new engines were carried to the stranded planes in the transport planes, installed by Army mechanics, and the damaged engines returned to the field via air transport. The success of this feature of the maneuvers has demonstrated that an air force may be set up wherever strategic exigencies may dictate, regardless of the condition or extent of surface transport systems.

Supply and maintenance was set up under field conditions with Maj. H. H. Arnold in charge and Capt. E. E. Adler. An Air Force Depot took care of servicing and maintenance under the direction of Lieut. C. P. Kane, in charge of supply, and Lieut. D. N. Dunton, in charge of engineering. Repair and maintenance consisted almost exclusively of removing worn or damaged units and replacing them with new equipment, although there were a number of instances where minor repairs were made to planes or engines. The successful functioning of this department is shown by the record of 97 per cent of planes in service throughout the period of the maneuvers. The First Transport Squadron of nine three-engined planes was under command of Capt. V. H. Pascale, with Warrant Officer Bradshaw assisting.

New Formations Tried

Tactical developments brought to light by the maneuvers, in addition to those relating to the employment of radio, and high altitude flying, included the adoption of several new formations. An excellent defensive formation for bombing squadrons was demonstrated with a seven-plane flight in blunt Vee formation with two planes closing the open end. The feature of this formation is that the planes are staggered down from the leader, instead of up, thus permitting the rear gunners of each plane to concentrate their fire in defense of any planes to their rear, and also permitting of the strongest possible defense against an attack from the rear. Another development was the definite abandonment of pursuit attack on bombing planes from the rear and below, this position having proved so vulnerable for the attacking plane as to place it under the ban. Pursuit tactics in attacking a flight of bombing planes included the perfection of a triple synchronized type of attack which involves long range harassing fire from a line of pursuit planes far to the rear of and above the planes under attack, followed by a perfectly timed simultaneous diving attack upon the bombers from their right and left front quarter. Attack planes flying along within 50 or 100 ft. of the ground were shown to mave a decided advantage over attacking pursuit groups, confirming the theory that the best defense of the attack plane is to fly as low as possible, taking all possible advantage of contour concealment. Attack planes were also used in connection with convoying bombers across the enemy line, the theory being that the attack squadron could so harass enemy anti-aircraft fire as to render it ineffective. The bombers would also be accompanied by the pursuit convoy flying above them as a protection against enemy pursuit. This use of attack planes, coupled with their employment against all manner of ground targets, is a development peculiar to America, as no other country has developed such an aerial arm. In general, it was found feasible to employ mass formations of as many as 54 pursuit planes, but using no more than eighteen planes in a single squadron and maintaining the basic element of three planes, each with a group leader. In the critiques following simulated aerial combat it was found highly desirable to increase the use of camera guns for training.

Combats Directed by Radio

Successful high altitude formation flying was demonstrated by the 95th Pursuit Squadron commanded by Capt. Hugh M. Elmendorff which flew in formation to above 25,000 ft. and maneuvered at that point. The planes, Pratt & Whitney powered Boeing P-12's, carried full military equipment.

One of the most promising advances demonstrated was the employment of radio within a single combat squadron for the direction of actual aerial combat by the squadron leader. In this work the squadron leader alone, Captain Elmendorff, was equipped with both sending and receiving apparatus, while each of his five element leaders was equipped with a receiving set. The pilots learned their signals just as a football team does, and without learning the telegraph alphabet they quickly became adept at interpreting the standard signals employed. The squadron leader, by this method, can take general orders from his Wing Commander, who may be either in the air or on the ground, and can transmit them as tactics demand to the other members of his squadron. In one spectacular demonstration a total of 62 pursuit planes, one squadron with radio communication and one without, staged a high altitude "dog fight" in which the radio equipped fighters were shown to have a decided advantage over their unequipped enemies.

Other radio developments included successful four-way communication between three squadrons in the air and a ground station, with the squadrons often widely separated, and with the point of command varied from the ground to the air. This employment of radio makes it possible for the wing commander to fly above or to one side of an aerial combat and direct his various elements as a checker player moves

about the board. Radio communication was shown to be very advantageous in coordinating bombing attacks with pursuit or attack squadrons. Equipment used was all of standard Army type, being either the SCR-133 Western Electric set weighing approximately 70 lb. and taking its power from an engine driven 12 volt generator, or the SCR-134 50 watt set weighing 100 lb. and sending or receiving telegraph or voice. Where a receiving set only was used an 11 lb. set with 15 lb. battery was found satisfactory. Ground radio was over the SCR-136 70 watt field set mounted on an Army truck and taking its power from a gasoline engine driven generator. Two way telegraph communication from ground to air was maintained over distances of 200 mi. and by voice as far as 80 mi. For general use the telegraph system was found much the best and was almost exclusively used, with consistent two way communication from plane to plane by telegraph code over distances of 70 mi. In general it was found that the radio equipment, although of a six year old design, was satisfactory. However, new equipment soon to be available will reduce the weight of the 70 lb. set to 40 lb., since the added weight is a material handicap to the pursuit planes. Another essential feature, particularly on the pursuit and attack planes, is the installation of a fixed antenna, rather than the trailing type, and the use of remote control, in order to remove the actual radio instruments from the plane's cockpit. It was also found desirable to develop radio tubes of more rugged type. In connection with the maneuvers a successful demonstration was given of new map sending system operating on a principle similar to the telephoto. This device, a development of the Westinghouse laboratories, was used to send complete sketches by radio, and will undoubtedly prove of great value in the transmission of maps, and in connection with observation work.

Make Night Photographs

Advances in military photography were demonstrated by the taking of a number of night pictures by means of a special apparatus which snaps the shutter of the camera at the moment when a flash bomb, previously released, reaches its maximum intensity. Remarkably clear photographs of Mather Field and of downtown Sacramento were taken by Lieut. E. B. Bobzien, of the 15th Photo Section. Another demonstration was the taking of an aerial photograph in daylight and then developing it on board the plane as it returns to its base and dropping the developed plate by parachute in order to shorten the time interval between obtaining the picture and interpreting it.

Of wide interest was the tactical employment of the new gyroscopic mechanical pilot developed by E. A. Sperry in conjunction with Army engineers. This instrument, installed on a Curtiss Condor bomber, successfully flew it over long distances with no one at the controls. It is stated that military employment of this device will be limited to its use in taking bombing planes through obscure weather to their mission, and in connection with the new Sperry bomb sight. In this latter case it has been found that more accurate bomb dropping can be accomplished if the pilot turns over the plane to the automatic pilot during the time that bomb dropping is being done. Another important application of this device will be in connection with aerial photography for mosaic maps, where it is essential that the plane be kept as nearly as possible on a level keel. Numerous test flights proved the Sperry "robot" to be a steadier pilot than any human agency.

Although the United States Army Air Service is pitifully small in actual point of numbers of planes and pilots in service, when compared with other leading nations, it is felt that the results of the Mather Field maneuvers show this country to be well in the lead in technical developments and the tactical employment of aerial forces. Plane for plane, our air service is unquestionably at least the equal of any in the world.

Club Offers M.I.T. Scholarship

COLUMBUS (OHIO)—A scholarship in aeronautical engineering at Massachusetts Institute of Technology is being offered by the Technology Club of Central Ohio. The scholarship covers the tuition fee of $400. Applicants must either be university students or graduates and must give satisfactory evidence of scholarship. The successful applicant will be selected by the club with the assistance of the dean of his college. Officers of the club are: R. R. Litehiser, president; E. M. Woodward, secretary-treasurer, and R. A. Allton, Thomas R. Lathrope, Wilfred A. Paine and Clarence E. Richards, scholarship committee.

Elect Guy Vaughn Head of Wright Aero

NEW YORK (N. Y.)—Wright Aeronautical Corp., Paterson, N. J., is now headed by Guy W. Vaughn, vice-president and general manager of the company for the past five years. His predecessor, Charles L. Lawrance, retired from the office of president to spend more time in engineering and research work for the Curtiss-Wright Corp., of which he is vice-president, a member of the board of directors, and on the executive committee. Other men elected at the recent meeting were: Arthur Nutt, chief power plant engineer of the Curtiss Aeroplane & Motor Co., a vice-president of Wright Aeronautical; Bruce G. Leighton, formerly in charge of engine sales, a vice-president in charge of sales and a member of the board of directors; Frank H. Russell, for some time a vice-president ot the Curtiss Aeroplane & Motor Co., a vice-president of the Curtiss-Wright Corp.

Guy W. Vaughn

To Hold Airship Base Hearings

WASHINGTON (D. C.)—Hearings concerning the selection of the $5,000,000 Pacific Coast Navy dirigible base are to be held sometime this week, it has been learned. Merits of both the Sunnyvale and Camp Kearney sites will be discussed, and later the committee will go to California to view the locations prior to a final decision.

Japanese Army Uses Irvins

BUFFALO (N. Y.)—Irving Air Chute Co. announces that Irvin parachutes have now been made standard equipment for the Japanese Army Air Corps. A re-order for Irvin chutes has just been received.

Form Canadian Firm To Handle Slot Rights

TORONTO (ONT.)—A public offering of securities is being made by the Aircraft Slotted Wing Corporation, Ltd., through local financial houses. The company has an authorized capital of $500,000 in seven per cent cumulative preferred shares of $100 par value, of which 2,500 are to be presently outstanding; and 20,000 shares of common stock of no par value, of which 15,000 shares are to become outstanding.

The preferred shares are redeemable in whole or in part at $110 and are being offered in a unit of one preferred and one common at $100 per unit. Of the 15,000 shares of common to be outstanding, 3,000 are allotted to Handley Page, Ltd., as part of the purchase price of the patents.

The company has been formed to acquire all Canadian and Newfoundland rights and patents covering the Handley Page automatic slotted wing device, together with the benefits of all existing contracts of Handley Page, Ltd., for licensing in Canada under these patents. In addition the company acquires the rights of all discoveries made by Handley Page in the future on all improvements to increase the lift of aircraft wings.

The business of the company is to grant a license on a royalty basis to aircraft craftsmen for the use of the Handley Page slots. The company, therefore, requires no factory or plant, its revenue being derived solely from royalties paid under license.

The English Handley Page company obtained $35,843 from privileges granted in Canada last year. Contracts have been entered into with DeHavilland Aircraft of Canada, The Curtiss-Reid Aircraft Co., Canadian Vickers, and the Ottawa Car Manufacturing Co., the last named producer of Avro planes.

A.S.M.E. Aero Meeting in Seattle

SEATTLE (WASH.)—University of Washington will be the scene of the national convention of the American Society of Mechanical Engineers, aeronautics section, May 28-29. This will be the first time the society has held that meeting in the West and it will be regarded as an incentive to aviation in this section, declares Prof. B. T. McMinn, of the University of Washington engineering department and secretary of the Western Washington branch of the A.S.M.E.

Douglas Contract to MacWhyte

KENOSHA (WIS.) — Contracts for streamline tie rods, bracing wires, and fuselage wire for 260 airplanes, have been given the MacWhyte Company here by the Douglas Aircraft Co. on a contract for Army and Navy planes. The contract will require six weeks.

TACOMA PUBLIC LIBRARY

Tri-State Show Held in Camden

Exhibition Ran April 18-26, Nineteen Aircraft Displayed

CAMDEN (N. J.)—This city's Tri-State Aircraft Show, held in Convention Hall, April 18-26, drew approximately 25,000 paid admissions during its eight-day run. Loyal D. Odhner, executive secretary of the Camden Chamber of Commerce, sponsor of the affair, was managing director. This Class C exhibit—the first of major proportions staged in this territory—contained exhibits from the states of Pennsylvania, New Jersey, and Delaware, and having been classed a success, it is planned to make the affair a yearly event. Nineteen planes and two gliders were on exhibition in the main auditorium, 127 x 220 ft., while some fifty accessory displays were housed in booths either surrounding the machines or located in a wing of the building.

Loyal D. Odhner

Nearly a dozen craft were stationed at Central Airport, about a mile from Convention Hall, and were kept busy taking aloft passengers who had presented their show tickets in part payment for flights. Universal Flying Service was one of the busiest pleasure-hop operators during the week.

Officials reported five craft and several gliders were sold at the exposition, the planes being two Wacos, two Monocoupes, and a Bird.

Keystone Fuselage Attracts

In the center of the main hall was one of the most interesting exhibits on view—a bare fuselage of a Keystone Patrician, employing steel tubing manufactured by the Summerill Tubing Co. and displayed by that concern.

Telephone-Typewriters, used for airport to airport communication along airlines, interested many of the visitors. These machines, produced by A.T.&T., were exhibited by Eastern Air Transport, which uses them at the various fields along its mail routes.

A continual stream of patrons passed up the stairway leading to the club Ford plane and commented on the luxuriousness of its appointments.

One of the new Jacobs, 7-cylinder, 140 hp. engines, which are to be manufactured in a plant now nearing completion at Central Airport, Camden, was shown installed in a Waco. The engines displayed included another Jacobs power plant, two Brownback Tigers, one with a section cutaway, and a Whirlwind J-5.

Decorative effects inside the building were obtained by wall-hung drapes on which had been painted scenes representing the different means and modes of transportation from earliest times until the present. Show patrons were favored with music broadcasts during the day and special events, including band concerts at night.

The day-by-day program of the show was as follows: April 18, opening day ceremonies; April 19, War Veterans' Day, Junior Model Plane Contests; April 21, Famous Pilots' Day; April 22, Women Pilots' Day; April 23, Air Mail Pilots' Day; April 24, New Jersey Day; April 25, Pennsylvania Day; April 26, Delaware Day.

Included among the various well-known fliers and personages who visited the show were Capt. Frank M. Hawks, who was towed from New York in his Eaglet glider; Col. Clarence M. Young, Parker Cramer, Martin Jensen, George Haldeman, Mrs. Opal Kuntz, Lieut. William White, Newark-Buenos Aires flier; Mrs. Keith Miller, Capt. William Lancaster, and Louise Thaden.

Few Non-Aero Displays

A committee of the following Camden Chamber of Commerce members aided director L. D. Odhner in managing the exposition: George B. Robeson, chairman of the aviation committee; Paul F. Cranston, director of publicity; Charles J. Mooney, director of sales; Kenneth F. Hicks, manager.

With the exception of a stand where "aviation fountain pens" were on sale and a booth where quite a miscellaneous collection of aeronautical publications was offered to the public, every exhibit had some rather definite aviation angle to it and had therefore been rightly accorded a place in the exhibition.

The airplanes displayed were a Challenger, Aeromarine Klemm, Bellanca Pacemaker, Bird, D-29-A Standard, Barling NB-3, Travel Air, Gipsy Moth, OX Robin, Monocoupe 90, Imperial, Kinner Waco, Jacobs Waco, Pitcairn Mailwing PA-7, Air-Istocrat SP7, Air-Istocrat Bullet, Club Ford, Davis V-3, and a KR-21 Trainer. There follows a list of exhibitors:

Aero Club of Pennsylvania, Aero Service Co., Airport Development & Construction Co., American Legion Cathedral of the Air Fund, Atlas Storage Warehouse Co., Atlantic Refining Co., Bonney Forge & Tool Works, Camden Chamber of Commerce, Camden County Vocational School (aviation department), Casanave Supply Co., Cleveland Heater Co., Cramer & Myers, (Ford dealer), Dallin Aerial Surveys, Eastern Air Transport, Electric Products Co. (Harwin Products Corp.), Gaul, Derr & Shearer Co. (Black and Decker Manufacturing Co.), Gimbel Brothers (WIPACS), Imperial Aircraft Co., Jacobs Aircraft Engine Co., Jarrett Collection of World War Ordnance (including anti-aircraft guns), Kendall Refining Co., Light Manufacturing & Foundry Co., Ludington Philadelphia Flying Service (Curtiss-Wright distributors), Metalab, Morris, Wheeler & Co. (Miller Falls Manufacturing Co.), New York *Times*, Parker & Co., Philadelphia Air Transport, Philadelphia Chamber of Commerce, Philadelphia Model Airplane Co., Pitcairn Aircraft, Inc., Public Service Corp., Radiomarine Corporation of America, R.C.A.-Victor Company, Inc., Richfield Oil Corp., Clark Rogers, Inc. (Standard Aircraft distributors), Sail-Me Co., Sears, Roebuck & Co., Skyhaven Airport, Standard Oil Company of New Jersey, Starlighters, Inc., (Del-Mar-Va Airport), Strandwitz & Scott, Inc., Summerill Tubing Co., Tri-State Regional Planning Federation, Truscon Steel Co., United States Aircraft Corp., U. S. Navy, U. S. Post Office and Air Mail exhibits, Vacuum Oil Co., Veterans of Foreign Wars, Wellston Manufacturing Co.

Tanager Features In Trial Monoplane

NEW YORK (N. Y.)—It has been learned here that the Curtiss firm, in line with its development of a commercial craft embodying the safety features of the Guggenheim Contest Tanager, has built an experimental monoplane carrying slots, flaps, and floating ailerons. The plane was assembled at the Garden City plant and is reported to have been initially test flown.

To Stage Air "Attack" During New York Show

NEW YORK (N. Y.)—One of the features to be staged in connection with the New York Aircraft Salon, May 3-10, is a sham attack on the city, to be engaged in by some seventy Army and Navy planes.

Lighter-than-air ships, headed by the "Los Angeles" and the ZMC-2, will also participate in the aerial tactics, May 3, 4, 5, 6 and 9. It is expected some of the attack planes will take-off from the aircraft carrier "Saratoga," which is scheduled to be riding at anchor in the Hudson during the show period.

Another side of the aeronautical picture will be emphasized on May 8, when Madison Square Garden will be the scene of a program honoring the pioneers of air travel. At that time the speakers will be Alfred H. Swain, vice-president of General Motors; Elisha Lee, senior vice-president of the Pennsylvania Railroad; P. W. Chapman, president of the United States Lines; and Col. Clarence M. Young, Assistant Secretary of Commerce for Aeronautics.

These men will tell how various types of travel have been linked together in producing the large network of air transport systems now in operation throughout this country.

With the announcement that permission is granted for the show to remain open on Sunday, May 4, a special program dealing with aeronautical education has been arranged for that day.

Speakers will include Lieut. Com. John W. Iseman, Commander, 3rd Naval Training Squadron, Rockaway Beach, L. I.; and Prof. Roland H. Spaulding, educational specialist of the Daniel Guggenheim Fund Committee of Elementary and Secondary Education. They will talk on teaching youth how to fly in safety.

Limitation of Plane Carriers in Naval Treaty

WASHINGTON (D. F.)—In the London Naval Treaty recently drafted aircraft carriers and their limitation were handled in Part 1, Articles III, IV, and V, as follows:

Article III.

1. For the purpose of the Washington Treaty, the definition of an aircraft carrier given in Chapter 2, Part 4, of the said treaty is hereby replaced by the following definition:

The expression "aircraft carrier" includes any surface vessel of war, whatever its displacement, designed for the specific and exclusive purpose of carrying aircraft and so constructed that aircraft can be launched therefrom and landed thereon.

2. The fitting of a landing-on or flying-off platform or deck on a capital ship, cruiser or destroyer, provided such vessel was not designed or adapted exclusively as an aircraft carrier, shall not cause any vessel so fitted to be charged to or classified in the category of aircraft carriers.

3. No existing capital ship shall be fitted with a landing-on platform or deck.

Article IV.

1. No aircraft carrier of 10,000 tons (10,160 metric tons) or less standard displacement mounting a gun above 6.1 in. (155 mm.) calibre shall be acquired by, or constructed by or for, any of the high contracting parties.*

2. As from the coming into force of the present treaty in respect of all the high contracting parties, no aircraft carrier of 10,000 tons (10,160 metric tons) or less standard displacement mounting a gun in excess of 6.1 in. (155 mm.) shall be constructed within the jurisdiction of any of the high contracting parties.

Article V.

An aircraft carrier must not be designed and constructed for carrying a more powerful armament than that authorized by Article IX or Article X of the Washington Treaty, or by Article IV of the present treaty, as the case may be. Wherever in the said Articles IX and X of the Washington Treaty the calibre of 6.0 in. (152 mm.) is mentioned, the calibre of 6.1 in. (155 mm.) is substituted therefor.

*This constitutes a general limitation, since ships of more than 10,000 tons are limited by the Washington Treaty.—Ed.

Cirrus Race Draws Many Entries

MARYSVILLE (MICH.)—Entry blank applications for the All-American Flying Derby have been received from more than a hundred pilots, states F. B. Maxwell, Jr., president of Cirrus Engines, Inc., sponsor of the event which will start from Detroit City Airport July 21.

Lower Davis Plane Prices

RICHMOND (IND.)—Revised prices are announced by the Davis Aircraft Corp., to take place immediately. The D-1, using LeBlond power, is to sell for $2,995, a reduction of $290 from the old figure of $3,285. Formerly $3,695, the LeBlond powered D-1-85 can now be bought for $100 less, or $3,595. A $190-cut is effected in the price of the D-1-K, Kinner-run, which is listed at $3,995 as against $4,185 formerly.

To Reorganize Command-Aire

LITTLE ROCK (ARK.)—Price Shofner, attorney, has been appointed receiver for Command-Aire, Inc., following a petition filed by Robert B. Snowden, Jr., president of Command-Aire, as a stockholder, and the Bankers Trust Co. and Union Trust Co., creditors. Mr. Snowden announced the action would not affect factory operations or the Command-Aire Flying Service, Inc., a separate organization. In a letter to stockholders telling of the plan the president said: "This action was taken to preserve the assets of the company and to protect the accounts of its creditors. Although the tangible assets of the company are at this time conservatively far in excess of its liabilities, the company has need of operating capital with which to continue." It was indicated a new group would be formed to take over the firm.

Brownback, Cirrus for Eagles

KANSAS CITY (MO.)—American Eagle firm engineers are now at work adapting the Eagle plane for the installation of radial air-cooled Brownback and air-cooled in-line American Cirrus type power plants.

Stage Glider Events At Bayside, May 1-2

NEW YORK (N. Y.)—As forerunner of the postponed New York Glider Carnival which will now be held some time in June, a special two-day glider program is being staged at a site on the Queensboro Golf & Country Club grounds, Bayside, L. I., N. Y., May 1-2, in conjunction with the New York Aircraft Salon which will then be in session.

This affair is held under the auspices of the Aeronautical Chamber of Commerce, the National Glider Association, and a group of New Yorkers interested in gliding. Among the judges in the competitions will be Prof. Alexander Klemin, New York University; and R. F. Dowd, Russell Manufacturing Co.

To Test Launching Device

Gliders obtained by the committee in charge for exhibition include three German-type craft of the American Motorless Aviation Corp.; two Cessna primary gliders, two Bowlus sailplanes, two Detroit Aircraft Corp. gliders, an Alexander Aircraft Corp. glider, and the Franklin glider "Eaglet," in which Capt. Frank Hawks was towed across the continent.

Among features of the show will be a demonstration by Captain Hawks in a plane-towed glider and the initial appearance of a new type automatic launching device for getting gliders into the air.

Among the entries received for the event to date are: Capt. Frank Hawks; Hawley Bowlus, holder of the American glider record; Lieut. Ralph Barnaby; Heinrich Knott, famous German glider pilot; Amelia Earhart, Bill Atwater, New York glider pilot; and Mrs. Keith Miller.

"QUOTES"

Rather the Dove than Mars. "I believe aviation is more an instrument of peace than of war. It tends to bring the nations of the world closer together and to know is to understand; knowledge lessens criticism."—REAR. ADM. RICHARD E. BYRD.

Collegians and Aviation. "The best time to train students for aviation is at the ages when they attend college. I feel that anything that can be done during this period to increase the number of pilots among college men will not only help in the development of civil aviation but will also give a background for flying officers for possible military expansion."—GROVER C. LOENING.

Hmm. "There's the commercial end of flying that I'm looking to a few years hence. I've spent some time digging into that end and have convinced myself—and don't be surprised before long if you see 'Ed Lewis Transports' flying over your head with the old 'Strangler' raking in plenty of profits."—ED "STRANGLER" LEWIS.

A Satisfactory Velocity. "Speed of the future commercial dirigibles will be 150 m.p.h. If a fish by wriggling its tail can outrace our fastest steamships and generate enough power to swim up waterfalls, as does the salmon, we'll be poor engineers if we can't get that speed out of an airship."—PAUL W. LITCHFIELD, Goodyear-Zeppelin Corp., in the *American Magazine.*

—But Not for Williams. "If 130 or 150 m.p.h. were to be the top speeds we could hope for in commercial air transportation, I would suggest that the public cease to waste its time on aviation and that they hereafter look upon it only as a hobby."—LIEUT. ALFORD J. WILLIAMS.

A Beginning. "I feel that we have a wonderful industry just now in the stage of preparation. That is about as far as we have gotten."—E. A. WATKINS, Watkins Manufacturing Co.

AERONAUTICAL FINANCE

By R. R. Doane

Statistical Summary

Weekly Comparisons

	Week Ended April 25th	Previous Week	Same Week 1929
Aviation:			
Aviation stock averages	29.09	31.00	48.25
Number of stocks traded in (1)	45	45	62
Volume aviation share sales (2)	780,500	1,666,600	474,900
Ratio aviation share sales to total sales (3)	3.58	4.46	2.13
General Market Data:			
Total volume share sales, N. Y. Stock & Curb Exchanges	21,800,800	37,291,140	22,108,970
Railroad share sales, N. Y. S. E.	428,740	600,880	587,110
Market averages (N. Y. Times)	239.99	245.60	245.48
New Domestic Financing	$57,374,000	$127,030,000	$38,516,500
Financial: (000 omitted) (4)			
Reserve credit extended	1,004,963	1,061,476	1,280,601
Brokers' loans	4,217,000	4,124,000	5,492,000
Bank exchanges, N. Y. C. H.	6,741,652	7,651,823	7,933,831
Investment reporting banks	5,747,000	5,731,000	5,909,000
Loans on securities, R. M. Bks.	8,238,000	8,163,000	7,353,000
All other loans, R. M. Bks.	8,607,000	8,666,000	9,078,000

Quarterly Comparisons

	Last Quarter Ended Mar. 31	Previous Quarter	Same Quarter 1929
Aviation new financing	682,000	7,712,000	59,250,000

Notes—(1) All stocks actively traded in on both New York Stock Exchange and the Curb Exchange; also contains over-the-counter stocks on which bid and ask quotations are regularly published. (2) Total volume both N. Y. Stock and Curb Exchanges. (3) Percentage of aviation stock trading to total volume of sales all classes of stocks on both exchanges. (4) Weekly Reporting Member Banks, Federal Reserve System.

THE OUTSTANDING recent events, insofar as the aviation financial situation is concerned, have been the passage in the lower House of Congress of the Watres Bill proposing a change in compensation for air mail carriage from a poundage to a space, weight, and mileage basis; and the struggle between the United Aircraft & Transport Corp. and the C. M. Keys' interests for control of the National Air Transport Co.

The effect of the latter contest may be easily seen in the vigorous movements of both of these stocks. From the middle of February, N.A.T. has moved from 14 to as high as 39⅜ on April 14, representing an increase in market value of approximately 170 per cent. U.A.T. moved from 46 to 99 during the same period, showing an increase of 115 per cent. The effect of the passage of the Watres Bill through the lower House is not so easily traced, although fundamentally it is of more importance to the industry.

The market for aviation stocks during this period of the past two weeks has been characterized by drift rather than by any marked trend, while the averages of eight leading air stocks have reached their high point for the present year.

Although Wall Street has long ago learned the inadvisability of discounting any favorable legislation affecting industry that might lay before Congress, yet due to certain peculiar considerations attached to problems of the National defense as well as that of further guarantees of efficient handling of the United States mail, it is universally conceded that the present House Bill 9,500 (Watres Bill) will pass the Senate and receive the President's signature some time within the next few weeks. As passed by the House April 21, the bill permits mail to be carried on the same planes with passengers at an allowance of not more than 40 cents for each cubic foot of mail, nine pounds being the equivalent to a cubic foot. For exclusive mail carriers the maximum allowance is $1.25 per mile. The bill further provides in Section 3, that whenever space contracted for is not required for the transportation of air mail, the Postmaster General may permit the utilization of such space for any other mail matter he may authorize to be so transported. It also provides for the acceptance of mailable matter of any description, and limits the contract period to not more than 10 yr.

The effects of this measure, if properly administered, will be one of profound significance to the industry, the full importance of which has not yet penetrated to the investing public's mind. Just how this is going to work itself out in air stock values is yet to be conjured with, and no doubt awaits the adjustment under the new schedules of the first contract renewals. It is the opinion of this writer that the full influence of this measure has not been fully discounted in the market.

Returning to the United Aircraft-N.A.T. episode recalls the old buccaneering days of our early railroad financing when rules were often changed during the heat of contest and new stock certificates printed overnight for delivery next day—to the astonishment of those who thought they had cornered the pool.

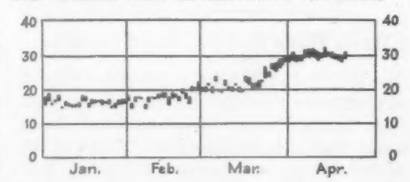
Now that the matter is settled and an agreement has been reached on the basis of three shares of N.A.T for one share of United in lieu of the original proposal of three and one-half shares for one, it might be of interest to recall some of the major contentions brought out during this brief struggle. On April 4, C. M. Keys, chairman of the executive committee of N.A.T., and Howard E. Coffin, chairman of the board, announced that the board had declined unanimously to recommend that the United offer be accepted by the stockholders. Mr. Rentschler, president of United, then announced that his company would go directly to the stockholders with the proposal. During this interval, it was stated, the directors of N.AT met and amended the by-laws making it necessary for a two-thirds majority to elect new directors, and a one-third majority to constitute a quorum. It was later announced by the United interests that they held 57 per cent of the outstanding stock of N.A.T, and had representatives present at the annual meeting on April 10 who were expecting to secure a voice.

After the discovery of the changes in the by-laws, United entered a petition in the Chancery Court of Delaware protesting that the meeting was illegally conducted and asking that it be declared void. The Court issued a rule requiring the defendant, N.A.T., to file an answer by May 9. This was immediately followed by the issuance of a call for a special gathering of N.A.T., stockholders for May 7 by Mr. Rentschler of United, under the ruling of N.A.T. by-laws permitting any stockholder holding one-fifth or more of the outstanding stock of the company to so call a special meeting.

It thus appears that up until the

Daily Price Range—U. A. & T. and N. A. T.

DAILY AVERAGES EIGHT REPRESENTATIVE AIR STOCKS*



**This includes composite daily average price ranges of Fokker, N.A.T., T.A.T., Aviation Corp. of the Americas, and the Big Four.*

agreement was reached the heart of the matter was surrounded by the legality of the N.A.T. directors' amendment of its by-laws. Quite regardless of the tactics employed, the N.A.T. directors were successful in securing a much better price while the United interests were equally successful in achieving their objective of a trunk line of air mail between New York and San Francisco.

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Handley Page Dividend Resumed

Handley Page, Ltd., are paying a dividend on their ordinary shares for the first time since the undertaking became a public company. The preference shares, which for 1927 and 1928 received their fixed 10 per cent, are to receive 12½ per cent for 1929. The ordinary shares will receive, including the amount represented by the 2½ per cent preference shares bonus, the equivalent of a return of approximately 66⅔ per cent. The manufacturing account, interest, royalties, etc., yielded £110,591, or about £4,140 more than in 1928, but general expenditure rose by £13,388, to £60,242, and net profits fell by £7,287 to £40,508.

The change from wood to all-metal planes accounted for the increase in costs. The following table compares the last three years' figures:

	1929	1928	1927
	£	£	£
Net profit	40,508	47,795	46,638
Brought in	24,605	11,724	.....
Available	65,113	59,519	46,638
Preference dividend	24,893	19,914	19,914
Ordinary dividend	4,979	.....	.....
Ordinary, per cent	66⅔	.....	.....
Reserve	20,000	15,000	15,000
Carried forward	15,241	24,605	11,724

During the year the company received £82,633 from the sale of patent rights (against £12,845 in 1928), and is applying £63,155 of this sum to writing off the balance of this capital item in the balance-sheet.

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Consolidated Instrument Report

The 1929 annual report of the Consolidated Instrument Company of America, Inc., shows a net loss of $105,866. Lucien L. Friez, chairman of the board, attributed the unprofitable showing to general depression in the aviation industry, resultant severe cuts in prices, and increased competition. He reports the removal of the company's executive offices to Baltimore, bringing reduced selling and administrative expense.

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Fairchild Aviation Sales

Gross sales of the Fairchild Aviation Corp., subsidiary of The Aviation Corporation, in 1929 totaled $3,494,000 compared with $2,656,000 in 1928, or an increase of $838,000. The sales force has undergone a thorough reorganization and an aggressive sales campaign is now under way, according to statements of the company. At the present time the company is producing about twenty-five planes a month, or normal production.

Firms Standardize on Supremes

WICHITA (KAN.)—Supreme propellers are to become standard equipment on American Eagle Aircraft Co. and Travel Air Manufacturing Co. planes, announces the Supreme Propeller Co., Wichita, following the closing of contracts with those firms.

Aeronautical Exports Increased in March

WASHINGTON (D. C.)—An encouraging increase in exports of aircraft, engines, and parts for March, 1930, is shown in the report of the Department of Commerce. An appreciable rise is seen in two of the three export classifications for March, 1930, as compared with February, 1930, although the valuation of all aeronautical exports is far below that for the corresponding month of 1929.

Twenty-seven aircraft, valued at $425,688, were exported during March of this year, contrasted with 38 planes valued at $686,655 for the previous March, while during February, 1930, 31 machines, worth $195,750 were exported.

Figures for the three-month period ended March, 1930, run somewhat below those for the same period of 1929. Sixty-nine planes, valued at $1,103,520 are recorded for January-February-March, 1929; 56 craft, valued at $885,702, for 1930.

Accessories Totalled $186,922

Aircraft parts and accessories, excepting tires, continued the increase noted in AVIATION [April 5, p. 732] although failing to touch the high figure of March, 1929. An appraisal of $186,922 is noted for March of this year, as contrasted with $141,434 for February, 1930, and $322,091 for March, 1929.

For the three-month period, 1930 is slightly ahead of 1929, a valuation of $526,674 being recorded as against $484,945 last year.

Exports of nineteen engines during March, 1930, were valued at $98,958, an increase of almost 50 per cent over the figures for February, 1930. During the previous March, 41 power plants, valued at $207,001, had been shipped. Fifty-seven engines, appraised at $255,661, were exported during the three-month period ending March, 1930. During the corresponding period of 1929, 97 engines, valued at $484,908, were exported.

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Waco Passes Dividend

The Waco Aircraft Company has passed its quarterly dividend of 25c. due May 1st. The last payment was Feb. 1, 1930.

Four Boeing School Scholarships Offered

OAKLAND (CALIF.)—Students in American colleges and universities are eligible to compete for the W. E. Boeing Scholarships, which will provide the winners with courses at the Boeing School, Oakland Airport.

The first award will be a master pilot ground school and flying scholarship, valued at $5,250, a nine-month course covering 203 hr. of flying and 924 hr. ground instruction; the second award, a master mechanic's course, 9 mo. in length, 1,224 hr. ground school, worth $675; third award, master pilot ground school course, 9 mo. long, 924 hr. ground school, value $600; fourth award, Private pilot ground school and flying course, 2 or 4 mo. long, covering 25 hr. ground school and 22 hr. of flying, value $575.

The successful candidates may enroll for courses either at the start of the July 7, 1930, quarter or the quarter starting Sept. 22. These scholarships offered cover full tuition.

Entrance Requirements

Any undergraduate student, including members of the 1930 graduating class, who will complete by July 15, 1930, one or more years of study in any American college or university which offers at least a Bachelor's degree in Arts or Sciences, is eligible as a candidate for the Boeing Scholarships.

1. Each candidate will be asked to present from the president or dean a letter stating that the candidate has maintained a scholastic standing sufficiently high to classify him in the upper one-third of his class for the entire period of his college or university enrollment.

2. Each candidate will be required to write an essay not exceeding 2,000 words on any one of the following subjects:

(A) Aviation's Contribution to Internationalism.

(B) The Development of Air Transportation and Its Possibilities.

(C) The Development of Safety Features on Established Air Transport Lines.

Each candidate will be allowed such advisory supervision from the faculty of his college as would be given on a regular college thesis.

3. A brief questionnaire outlining the candidate's interest in physical education and extra-curriculum activities must accompany the candidate's essay. Questionnaire forms have been mailed to the office of the president or dean of the college.

Method of Award

Essays will be finally judged by a national committee of award, composed of prominent educators and leaders in the aeronautical industry, whose names will be announced later.

The candidate who is selected for the first award must be able to pass the Department of Commerce Transport Pilot physical examination which may be given by an approved local physician after awards are announced. If this candidate fails to pass this examination, or prefers the master mechanic course, such a course will be offered to him. The master pilot ground school and flying course will then be offered to the candidate of second national ranking.

Berry to Handle Stinson Work

DETROIT (MICH.)—Finishing requirements for Stinson planes will be handled by Berry Brothers, Inc. during the current year.

Aviation Insurance Discussed by Barber

NEW YORK (N. Y.)—An outline of aviation insurance, its development and problems, has been prepared by Horatio Barber, president of Aero Underwriters Corp., following publication recently of criticisms on aeronautical insurance.

He especially considers statements and statistics, apparently those issued in the report of the Daniel Guggenheim Fund for the Promotion of Aeronautics [AVIATION, March 15, p. 535]. Where the fund declares "that the insurance industry does not have a true conception of the hazards of aviation or the relative degrees of risk," Mr. Barber believes insurance firms depend on underwriters trained in handling aero risks instead of developing experts among their own employees.

In expressing his views on the rate question, Mr. Barber divides that problem into three parts: (1) Aviation life insurance, (2) Present level of aviation insurance premiums, (3) Desirability of rate schedules.

Does Not Think Rates High

Under the first heading he cites the difficulty of writing a life policy in comparison to the issuance of other aero insurance forms covering a year or less. The company "may be satisfied with the kind of flying done by the insured at the time of his application, but can have no redress in subsequent years when excessive hazards may be engaged in.

"It has been stated quite frequently that aviation insurance premiums are excessively high when compared with the actual risk as evidenced by accident statistics," he continued.

"The exponents of such a theory rely upon accident experience as evidenced by statistics covering the whole field of aviation and their conclusion that such statistics show present rates to be excessively high would only be correct *if the business received by the insurance companies covered all aviation risks and each one in similar amount.**

"What happens, however, is that the selection is against the insurance companies. In other words, the aviation industry knows something itself about the risks it is running with the result that it is naturally keen to secure insurance against the worst risks, whereas it is not so keen to cover the best, many of which it will run itself without insurance.

Business Done is Criterion

"Therefore, it is obvious that the only statistics of the slightest value in making aviation insurance rates are those showing the result of actual business done by the insurance companies.

"Those underwriting statistics kept carefully over a long period of years show conclusively that not only are aviation insurance rates not excessively high but that, unless risks are rendered less hazardous, rates must be raised necessarily before long."

As to the regulation of prices through use of rate schedules, Mr. Barber notes the value to Aero Underwriters of a classification code prepared by Aero Engineering & Advisory Service, a subsidiary company. However, regardless of the data available, he does not believe it is "possible to formulate an equitable tariff of rates at this time. 'Equitable' is used advisedly because a tariff could be set up from the present underwriting statistics but only at rates higher than those prevailing."

Another reason why fixed rates would not be feasible at the present, states Mr. Barber, is the "constant succession of new forms of risks and modifications of existing ones arising daily" as the result of aviation's progress and development.

*Mr. Barber's italics.

Five Plane and Engine Firms Consider Merger

KANSAS CITY (MO.)—The merger of several light plane companies and engine concerns is forecasted as AVIATION goes to press, with the holding of conferences here of the interested parties.

The firms considering merger plans are American Eagle Aircraft Corp., Lincoln Aircraft Co., Light Manufacturing & Foundry Co. (maker of Brownback Tiger engines), Szekely Aircraft & Engine Co., and the Golden Eagle Aircraft Corp.

Those in attendance at the meetings were E. E. Porterfield, Jr., of Eagle; Victor H. Roos, Lincoln, and O. E. Szekely and F. E. Bradfield, Szekely. R. O. Bone, president of the Golden Eagle firm, Columbus, Ohio, asked to be considered a party to the proceedings though he was unable to attend in person.

Present intimations point to the formation of a $2,000,000 company with American Eagle as the nucleus. It is likely each concern would maintain its present basis of operations, reports from the conference indicate.

Du Pont Rayon Awards Prize

NEW YORK (N. Y.)—Martha Sluder, Boston, has been awarded the $100 prize offered by the Du Pont Rayon Co. for the best design submitted by artists in the Fourteenth Annual Textile Design Competition and Exhibition for use in upholstering the side walls of plane cabins. Miss Sluder's drawing pictured palms, mountains, and flying birds in accordance with the contest rules, which stated such objects be used as motifs.

General Tests New Steel Prop

BUFFALO (N. Y.)—General Airplanes Corp. is testing a specially designed three-blade propeller on an all-metal mail plane at the Municipal Airport. The propeller produced by the Hamilton Standard Propeller Co., was manufactured at a cost of $1,950 and has three 13-ft. blades.

Massachusetts Tech Undertakes Fog Study

ROUND HILL (MASS.)—A laboratory for the study of fog has been completed here recently at the Round Hill Airport, owned and operated by Colonel E. H. R. Green. Studies are being made now by representatives of the Massachusetts Institute of Technology of such problems as accurate methods for measuring absolute humidity, with the ultimate purpose of learning how fogs may be dispelled, if at all. They already have been classified into such division, as arctic sea smoke, tropical air fogs, haze, early morning mists, ground fog and others.

A special study is concerned with the size of droplets composing various kinds of fog, with a view to determining how this factor affects visibility. Distribution of temperature in fog and clouds at various heights will be investigated also, while penetration of light of various colors through fog and mist is another question which will receive special attention. The work is under the general direction of Prof. Edward L. Bowles, with the co-operation of Prof. Carl G. Rossby, formerly of the Geophysical Institute of Bergen, Norway, and Prof. W. G. Brown. The latter two men served with the Guggenheim Fund for the Promotion of Aeronautics in special studies.

Menasco Plans Pirate Campaign

LOS ANGELES (CALIF.) — Regular production having started on the Pirate engine, Menasco Motors, Inc., is now preparing an aggressive sales campaign for that power plant. President A. S. Menasco announces R. Ernest Tucker has been appointed sales manager, and that a New York office will be opened May 1, with Milton Menasco, Eastern representative, in charge. Installation of up-to-date machinery and equipment will permit the production of twenty to sixty engines per month. On a recent Los Angeles-Colorado Springs round trip made by firm officials it was stated an average of only 6.5 gal. of fuel per hour were consumed and less than 3 pt. of oil were used for the approximately 2,400 mi. The plane used was a Great Lakes, Pirate-powered.

Complete Pennsylvania Body

PITTSBURGH (PA.) — James F. Woodward, Secretary of Internal Affairs, is announced as chairman of the Pennsylvania State Aeronautics Commission, which is composed of the following: Robert M. Ginter, vice-chairman; John C. Kelso, secretary; Maj. J. Sidney Owens, Commanding Officer of the Aviation Division, Pennsylvania National Guard; Hollingshead N. Taylor, Philadelphia; Maj. Charles J. Biddle, Philadelphia; John P. Wolfinger, Reading; Richard W. Robbins. The commission has three inspectors in the field.

BRIEFLY

Frederick B. Patterson, president of National Cash Register Co., has given funds for an aviation school at Dayton (Ohio) Municipal Airport, in memory of his father. The school will be unique in having an endowment to defray part of the operating expenses.

Curtiss-Wright Flying Service now has three crop-dusting planes operating from Alameda (Calif.) Airport, and is moving others from Texas.

Eighteen airplanes assessed at $70,000 by the city tax collector, owned by eleven companies or individuals, are operated from Felts Field, Spokane, Wash.

Judge C. S. Turnbaugh, Youngstown, Ohio, has ruled that an airplane is a "motor vehicle" within the meaning of Ohio statutes.

Six Alexander gliders have recently been sold in Minnesota. Among the purchasers were the University of Minnesota and the Minnesota Society of Aeronautical Engineers. Halley Aviation Management, Omaha, Neb., has ordered ten Alexander gliders.

Aero Club of Buffalo (N. Y.) Inc., which recently opened club rooms in the Hotel Statler, is now a chapter of the National Aeronautic Association.

John Crain has been elected president of the San Antonio chapter of the N.A.A. Chapter plans for the year include improvement of Winburn Field, and promotion of airmarking of neighboring towns.

One pursuit squadron from Selfridge Field, Michigan, has been authorized to attend an air meet at Kingston, Ontario, June 3.

Reynolds-Cresswell Air Photo Co., Utica, N. Y., has begun operations, using a Waco plane with Hispano-Suiza engine.

Parks Airplane and Engine Mechanics' shop has been approved by the Aeronautics Branch as a repair station.

Vincent Bendix, president of Bendix Aviation Corp., has been decorated as commander of the Royal Order of the North Star by King Gustav of Sweden.

Funds are being raised to purchase an airplane for Rev. George H. Woodley, an Alaskan missionary who covers an extensive territory in his work among the Chilkoot Indians. He is taking flying instruction at Roosevelt Field.

Rogers-Ham Co., Boston Airport, is offering free flying instruction to purchasers of Davis monoplanes.

Otto Hillig, photographer who sued the Luftschiffenbau Zeppelin Co., owners of the Graf Zeppelin, when he was kept from going on the airship's world flight after purchasing a ticket, has settled out of court for $25,000.

Four Loening amphibions were used in a recent six-day aerial survey of the Philippine Islands by the Army Air Corps.

Porterfield Aviation Interests, Inc., Kansas City, has asked release from a contract calling for improvement and seven years' lease of Falls City (Neb.) airport, on the grounds that present business conditions make the operation inadvisable.

Prize money amounting to $525 will be awarded to winners of air races and contests at Pasco (Wash.) airport, May 15-17.

Three Continental A70 aircraft engines undergoing endurance tests in the company's Detroit laboratory have been run 1175 hr. at full throttle, according to a recent report issued by Continental Aircraft Engine Co. This model engine has been granted Approved Type Certificate No. 32.

Ivan L. Gaddis, Omaha, Neb., is making arrangements for the formation of a flying circus to visit Nebraska and Iowa cities.

NYRBA Lines has accepted delivery of the first of several Model 20 Fleetsters ordered from Consolidated Aircraft Corp., Buffalo, N. Y. The new model is built for mail and express only.

Production of Irving Air Chutes at the new Bridgeburg, Ont., plant will begin early this month.

New Firms Announced

ALEXANDRIA AVIATION ASSOCIATES, INC., Los Angeles, Calif.; capital, $25,000; by R. A. DuPont, R. L. Read, Edward W. McKinney, and Robert L. Faucett.

UNIVERSAL AIRCRAFT CORP., Northern Life Tower, Seattle, Wash.; capital, $90,000; Porter Sligar, general manager; to build a one-place flying boat.

BRINTON-BAYLES FLYING SERVICE, INC., Springfield, Mass.; capital, $50,000; by H. Roscoe Brinton, Lowell R. Bayles, and James P. Moriarty; to deal generally in all kinds of aircraft and accessories.

ORANGE COUNTY AIRWAYS, INC., Middletown, N. Y.; capital, 500 shares preferred stock at $100, and 700 shares common, no par value stock; by R. Vincent Lord, Roy D. Monroe, W. H. Hallock, and Stephen C. Hallock; to operate airports.

GARDNER FLYING CLUB, INC., Gardner, Mass.; capital, $50,000; by Edward C. Lafortune, Peter Bonk, and Bernard O. Paige; to deal in all kinds of aircraft and accessories.

CANADIAN AERO CLUB., INC., Montreal, P. Q.; capital, $25,000.

READING AIRWAYS, Reading, Pa.; capital, $25,000; by William P. Hain, Charles V. Zabel, and Adam J. Spatz, treas.; to transport passengers, baggage, and mail.

WINGS, INC., Cleveland, Ohio; capital, $150,000; to make investments in aviation enterprises.

PADUCAH AIRWAYS, INC., Fort Wayne, Ind.; by Mr. and Mrs. W. J. Ashley, and Kenneth Seibert; to sell airplanes, carry passengers, and instruct students. Operations will be carried on from the Paducah (Ky.) Airport.

TRADE TIPS

It has been reported that

Preliminary sketches for a $6,000,000 main terminal building, "A" shaped, 685x620 ft., to be constructed of concrete and steel with hollow tile walls, stucco and terra cotta finish, have been approved by All American Airways, Inc., Miami, Fla.

Gogebic County, Mich., has acquired a 125-acre site which will be developed into an airport. A. F. Winkler, Bessemer, Mich., is manager of the development.

Ontario Provincial Air Service, Toronto, Canada, will purchase additional planes.

Contracts for improvement of ten emergency fields between El Paso and Fort Worth, Tex., will be let soon by the Airways Division of the Department of Commerce.

Preparation of an aerial survey map of Portland, Ore., is recommended in *Plan-It*, bulletin issued by the city planning commission.

Maj. J. A. Motherwell, chief of the Department of Fisheries of the Federal Government of British Columbia, will receive bids for seaplane patrol of coast fishing areas, contracts calling for use of three planes to be operated 400 hr. each year for two years.

Schools and Colleges

VON HOFFMANN AVIATION SCHOOL, St. Louis, Mo., is to have a special course for women fliers, which will be organized by Mrs. Mae Haizlip.

D-W AIRPORT, LeRoy, N. Y., opened flying classes recently with 35 students enrolled.

TRIANGLE FLYING CO., Poughkeepsie, N. Y., has opened its summer flying course with fourteen new students.

RAPID AVIATION, INC., Omaha, Neb., has recently finished an aviation clerical course said to be the first of its sort in the country. Six girls graduated from the course which covered the office routine and sales procedure of aircraft firms.

WOODALL FLYING SCHOOL opened April 21 at Love Field, Dallas, and offers instruction leading to all flying licenses.

UNIVERSAL FLYING SCHOOL, Kansas City, announces that it will hereafter offer training with Diesel engines as well as with the usual types.

CURTISS-WRIGHT FLYING SERVICE will open a school at the Portland (Me.) Airport June 1. Twenty students are reported to be enrolled.

PARKS AIR COLLEGE, East St. Louis, Ill., has announced the opening of courses in gliding on May 2.

WILMINGTON HIGH SCHOOL, Wilmington, Del., offers classroom study in aeronautics, ground school work on engines, and flight training if the student desires it. The Aero Club of the school has bought and is assembling a glider.

PERSONNEL

LIEUT. BERT HALL has been appointed an advisor to the Chinese Air Ministry. He was a member of the Lafayette Escadrille.

VANCE BREESE, former president of Breese Aircraft Corp., Portland, Ore., is now flying representative of Detroit Aircraft Corp. in the Pacific Northwest.

E. E. WILSON, president of Hamilton Standard Propeller Co., has been elected president of Sikorsky Aviation Corp., Bridgeport, Conn., which is also a subsidiary of United Aircraft & Transport Corp. A. C. DICKINSON, retiring president of Sikorsky, becomes chairman of the board of directors.

E. E. Wilson

A. J. HARTMAN has been made manager of Burlington (Ia.) Airport. He will receive $250 per year, but will pay that sum for concession privileges and repair shop rental.

A. HARRIS is now chief instructor for West American Air Schools, Sacramento, Calif.

A. L. BETTYS, formerly with Axelson Aircraft Co., has been made engine chief for Varney Air Lines.

LEE TRENHOLM has resigned from Bruno & Blythe to open an office at 345 Madison Ave., New York, N. Y., as public relations counsel. In the past, he has acted for a number of aeronautical firms, including The Aviation Corp.

William G. Rose

JOHN M. YOLTON, formerly in the aeronautical sales department of Goodyear Tire & Rubber Co., is to be operations manager of the National Elimination Balloon Race to determine American entrants in the Gordon Bennett International Balloon Race. The appointment of WILLIAM G. ROSE as manager of the international race, which will be held from Cleveland Sept. 1, was recently announced.

WILLIAM HARRIS, sales manager, has been promoted to the position of operations manager of the Boston base of Curtiss-Wright Flying Service. NEIL PRATT, formerly assistant sales manager in New York, becomes sales manager in Boston.

CHARLES S. RUSSELL has resigned his position as airport construction engineer for Curtiss-Wright Flying Service and established an office in the Hightower Building, Oklahoma City, where he will do business as an independent consulting engineer.

E. R. DECARY has been elected president of the Montreal Branch of the Aviation League of Canada.

WALTER X. BRENNAN is now head of the aircraft division of Belle Isle Boat & Engine Co., Detroit, Mich.

JOHN C. GRAVES, division traffic agent for T.A.T.-Maddux Lines at Kansas City, Mo., has been made assistant traffic manager of the Eastern Division. ALBERT J. DONAHUE, district traffic agent with headquarters in New York, N. Y., is now passenger agent of the division.

RUSSELL AHRENS has been made traffic agent for Pacific Air Transport, succeeding GEORGE STREHLKE, resigned to enter another line of business.

R. W. PROCTOR, sales manager of Van Dorn Electric Tool Co., has been made sales promotional manager for Black & Decker interests including Black & Decker Mfg. Co., Van Dorn Electric Tool Co., Domestic Electric Co., and Marschke Mfg. Co., as part of unification of the various company activities.

JOHN BLAINE, formerly with Airport Construction Co., is now manager of Big Spring (Tex.) Airport.

CAPT. H. C. FERGUSON and COL. HENRY BRECKENRIDGE have been made directors of the Bellevue (Neb.) airport corporation.

PAUL M. HEWITT, recently general manager of Art Goebel Aviation Co., Kansas City, has been appointed regional sales promotion manager for Parks Air College.

CHESTER J. FENTON has been appointed manager of the Toledo Airport.

JOHN C. ARDAGH, R. A. KYLE, and ROBERT NEWTON, with headquarters in Chicago, New York, and Cleveland, respectively, have been transferred to the Welder Service Division of Lincoln Electric Co., Cleveland, Ohio, makers of Linc-weld motors and Stable-Arc welders.

Representatives Named

CURTISS-WRIGHT — Interstate Airlines, Nashville, Tenn.; Alabama Aircraft Corp., subsidiary of Davis Airlines, Birmingham, Ala.

HAMILTON STANDARD PROPELLER—Air Associates, Inc., Roosevelt Field, L. I., N. Y., sales and technical service representatives for the New York territory.

COMMAND AIRE — Great Northern Aviation Corp., St. Paul, Minn., northwest distributor.

AEROMARINE KLEMM—Hunt Aircraft Mfg. Co., Providence, R. I.; Airview Flying Service, Red Bank, N. J.

ALEXANDER - EAGLEROCK GLIDERS — Bigelow-Johnson Co., Spokane, Wash.

EASTMAN FLYING BOATS—The Belle Isle Boat and Engine Co., Detroit, Mich., distributor for Michigan and Toledo, Ohio. A sales office will be established on E. Jefferson Ave.

WACO—Paducah Airways, Inc., Paducah, Ky., distributors for parts of Kentucky, Tennessee, Illinois, and Missouri.

AERONAUTICAL CALENDAR

May 27-30	All-New England Air Tour, starting from Springfield Airport, Springfield, Mass.
June 28	Annual R.A.F. Display, Hendon, Eng.
July 20-Aug. 7	International Light Plane Tour, starting from Tempelhof Airport, Berlin, Germany.
July 21	All-America Flying Derby, starting from Detroit, Mich. Sponsored by American Cirrus Engines, Inc., Marysville, Mich.
Aug. 23-Sept. 1	National Air Races, Chicago, Ill.

EXPOSITIONS

May 3-10	New York Aircraft Salon, auspices Metropolitan New York Division, Distributor-Dealers Section, Aeronautical Chamber of Commerce, at Madison Square Garden, New York City.
June 2-7	Northwest Aircraft Exposition, the Coliseum, Minneapolis-St. Paul, Minn. Show Director, Ray Krimm, 601 Wesley Temple Bldg., Minneapolis.
June 28-July 6	Pacific Coast Aeronautical Exposition, Oakland, Calif., Municipal Airport.
July 6	International Transportation Exposition, Warsaw, Poland.
Sept. 6-8	International Aero Exhibition, Stockholm, Sweden.

MEETINGS AND CONFERENCES

May 5	A.S.M.E. conference on economy of maintenance and operation, New York, N.Y.; Fiftieth Anniversary Meeting.
May 5	Sixth Annual Army-Navy Standards Conference, Wright Field, Dayton, Ohio.
May 14-16	National Conference, Airport Section, Aeronautical Chamber of Commerce, Buffalo, N. Y.
May 19-22	Fourth Annual Technical Aeronautical Meeting, A.S.M.E., Wright Field, Dayton, Ohio.
June 9-12	Semi-annual meeting, A.S.M.E. Detroit, Mich.
July 3-5	Western States Aeronautical Conference, Medford, Ore.
Sept. 1-6	Fifth International Air Congress, under the auspices of the Royal Aero Club; The Hague, Holland.

AIRPORT DEDICATIONS

May 27	Turners Falls-Greenfield, Mass.
May 30-June 1	Dedication and Air Circus, Colusa, Calif., Municipal Airport.
May 30-June 1	Dedication and Air Meet, Bowles Airport, Springfield, Mass.
May 29-31	Abilene, Tex., Municipal Airport.
June 20-21	Randolph Field, San Antonio, Tex.
July 4	Kelso, Wash., Airport.
Aug. 30-Sept. 1	Williamson Johnson Airport, Duluth, Minn.

AIRPORTS AND AIRLINES

Senate Approves Watres Mail Bill

Measure Awaits Hoover's Signature to Become Law

WASHINGTON (D. C.) — Only the President's signature remains to be attached to the Watres air mail bill before it becomes a law. After 7 mo. of conferences and negotiations between the industry and the Postmaster General, the Postmaster General and the congressional sponsors of the bill, the sponsors of the bill and Congress itself, the bill was passed without opposition or change by both House and Senate within a single week. There is no doubt of the President's signing the bill, and that before May 5.

The action of the Post Office Department in withdrawing the advertisements for proposals on the five lines on which contracts expire at midnight, May 5 (Boston-New York; Chicago-St. Louis; Chicago-Dallas; Salt Lake City-Los Angeles; Salt Lake City-Pasco) is doubtless based on the fact that the ten-day period during which a president must sign or veto a bill presented for his signature expires May 4. As the present air mail bill seemingly has had presidential backing, both in its inception and its recent congressional career, its enactment into law is regarded as inevitable.

District airport hearing held

A hearing was heid by the House Committee on Public Buildings and Grounds April 25 on the Bingham-Nelson bills to provide a commercial airport for the District. These are the bills, introduced into both Houses, which were drawn up by the Joint Commission on Airports, proposing the consolidation of the present Hoover Field, Washington Airport and adjoining lands to form a municipal airport. The hearing was continued until April 30.

Two bills were introduced April 24 by Representative Stalker providing for the establishment of airports at two different sites. One provides for the reclamation of Gravelly Point and its establishment as a port for the accommodation of both heavier- and lighter-than-air craft. The total sum to be expended is limited to $1,500,000, of which a yearly expenditure of $750,000 is to be borne in equal proportions by the District of Columbia and the Treasury. (Entire cost of $2,500,000 authorized by the Bingham-Nelson bills is to be borne by the District, control to be vested in the District Commissioners but title held by the United States.) Mr. Stalker's second bill provides for a commercial airport, for use by land and seaplanes, to be established within the District on a site in the vicinity of the War College, at an expenditure of $2,000,000 to be appropriated from the revenues of the District and the Treasury. Both bills were referred to the Committee on Public Buildings and Grounds, and probably will be discussed at the next hearing on the Bingham-Nelson bills.

Penna. Amends Port Requirements

HARRISBURG (PA.)—The State Aeronautics Commission at a recent meeting amended its rules in accord with the conference of airport operators and pilots held here on March 26. The amended rules require airports and landing fields used for passenger carrying or school instruction to be at least 1,500 ft. square with clear approaches or have two landing strips 1,500 ft. in effective length. The commission also granted full commercial licenses to the following: Sunbury Flying Field, Sunbury; Bettis Field, McKeesport; Stulz Field, Altoona; John J. Jacobs, Sky Haven, Goshenville; Pottsville Airport; Bethlehem airport, operated by Jesse Jones, Lancaster; Millersburg airport, and Veale Aviation, Inc., Hazleton.

Bureau of Standards Pushes Radio Research

WASHINGTON (D. C.)—Tests are now being conducted by the Bureau of Standards to determine most suitable types of radio antennas for aircraft for different conditions. The vertical pole type developed by preliminary tests in 1928 still seems most advantageous ordinarily, but in some cases, particularly when there is danger of ice formation, it may have marked disadvantages, and the subject has consequently been reopened for study. Other types thus far tried, however, seem to have too high directional errors, though some of them give localizing effects when directly over the beacon which are very useful.

The Bureau is also engaged in developing a radio direction finder for aircraft use, and in further research connected with different types of course indicators. The latter are preferable to the direction finders for use on regular air lines, but of course have little value to the flier who wishes merely to utilize the beacons to keep on a course of his own. Flight tests of a direction finder employing two small crossed loop antennas rotating as a unit, with special control features, will soon be begun.

United Secures Control of N.A.T.

Frederick B. Rentschler Named N.A.T. President

NEW YORK (N. Y.)—The struggle between National Air Transport and United Aircraft & Transport Corp. for the future control of the services now operated by N.A.T. was settled rather abruptly out of court, so to speak, last week in favor of United.

The settlement came about through conferences between C. M. Keys and Frederick B. Rentschler, the proponents, respectively, of the powerful Curtiss-Wright and United groups. It was consummated in the face of a special meeting of N.A.T. stockholders called for May 15 by United, which claims possession of 57 per cent of N.A.T.'s stock, and in the face, also, of a pending suit by United to test the legality of the annual meeting of N.A.T., April 10, in which United's campaign for control of the former had been temporarily thwarted.

A few of the new officers of N.A.T. have been announced. Mr. Rentschler has been elected chairman of the board of directors and president, replacing Howard E. Coffin and C. M. Keys, respectively. J. F. McCarthy has been named secretary and treasurer, replacing J. J. Mitchell. It is understood that C. T. Ludington and a number of directors have resigned but their successors have not been announced as we go to press. It is understood, also, that Paul Henderson, who has been first vice-president, has been retained but his duties under the new organization have not been announced.

Ends extended controversy

The outcome of this controversy, which began early last month [See all issues of AVIATION for April], is of tremendous significance since it involves the two leading interests in the American aviation industry and one of the longest, oldest, and most important of this country's airline operators. United's position in the industry is immeasurably strengthened by the recent decision.

N.A.T. was not actually owned by Curtiss-Wright but was very much on that side of the fence through coincidence of leadership and financial control, etc.

The immediate cause of the event was the desire of United to gain control of N.A.T.'s air mail contracts, particularly the New York-Chicago section of the transcontinental route.

(Continued on page 921)

First Sprinkler Tests Staged at Washington

WASHINGTON (D. C.)—Preliminary tests to determine the efficiency of automatic sprinklers in hangar fires were conducted at the Bureau of Standards' test hangar April 22, 23 and 24. Three types of fire were ignited at that time, with varying results. No conclusions can be drawn until the major blaze of April 29.

The three fires held during the first week of the tests were started in the wall of the hangar, spreading to the upper wing of a plane; in the interior of a lower wing; in gasoline on the floor and in the drip pan under a plane. The tests were run with dry pipe, wet pipe, and open sprinklers (over-head only). Conditions simulated were those in which: (1) A blow torch or soldering iron would be set in such a way as to impinge its flame on the wooden wall; (2) an electrical short circuit would occur; (3) and leaking gasoline would overflow the drip pan and spread on the concrete floor.

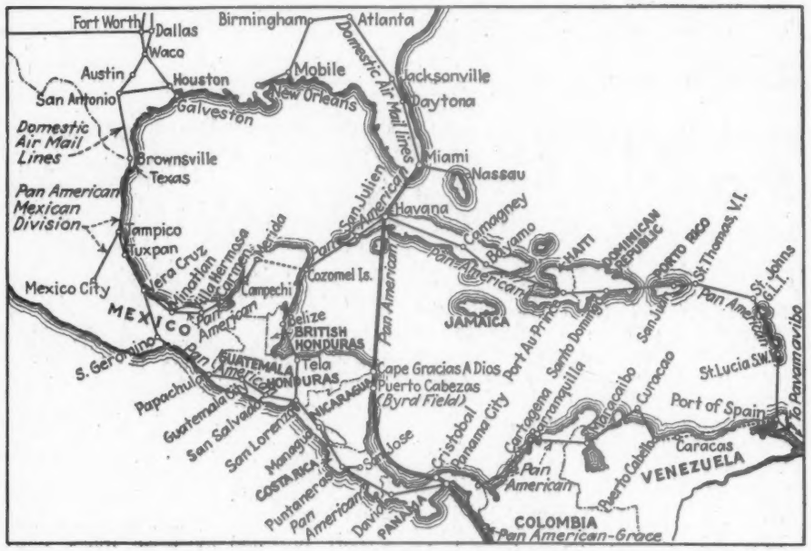
Fire in the hangar wall was extinguished by the sprinklers. In the case of the planes in some instances fabric was consumed and wood charred, but the flames were confined to the plane ignited. Officials feel that the tests have not progressed far enough, however, to justify any conclusions as to the value of the sprinklers. One hundred sprinkler heads, representing more than a dozen makes, have been installed. In order to prevent the walls from becoming water-soaked sheets of waterproof paper have been fastened between the vertical studs adjacent to the corners of the building. Sections of this paper are removed as is necessary, to expose a dry wooden surface to each test.

Colonel Blee Heads Committee

Scientists of the Bureau of Standards are counting the number of seconds after the fire has been started before the sprinklers are affected, the length of time after that before the water begins to flow, and the minutes consumed in extinguishing or checking the blaze. After the series of tests has been completed the Fact-Finding Committee, headed by Col. Harry H. Blee, Director of Aeronautic Development of the Aeronautics Branch, will co-ordinate the results obtained.

The most significant of the fires were arranged for April 29 and 30. Three planes were to be ignited in one test on April 29. A flaming torch was to be drawn rapidly across the floor under the planes, to ignite flowing gasoline. In addition to this, a large quantity of "loose" gasoline was placed in the center of the three planes. A fire of serious proportions or an explosion was expected. On the following day, if there remained any planes or hangar in which to stage the tests, a fire was to be started inside the fuselage of a plane or in the engine compartment by leaking gasoline.

P. A. A. Opens New Route Across Caribbean



NEW YORK (N. Y.)—The first regular flight over the new Pan American Airways route between Havana and the Canal Zone was completed by Colonel Lindbergh, technical advisor to the company, 4:04 p.m. (Eastern Standard time) on April 27, 2 hr. ahead of schedule. The new route is practically direct between Havana and Cristobal across the Caribbean Sea and with a single stop for fuel at Cap Gracios a Dios, on the northeast coast of Nicaragua. This route has been inaugurated to save two days over the former route through Central American points and make possible a seven-day mail service between New York and Buenos Aires.

Lindbergh's schedule was as follows: Left Miami at 3:33 p.m. on April 26, arriving at Havana at 5:36 p.m. Left Havana at 5:33 a.m. on April 27 and landed at Byrd Field, Cape Gracios a Dios, at 11:37 a.m. Left there at 12:12 p.m. and arrived at Cristobal at 4:04 p.m. The route includes about 1,033 mi. and the flying time was 9 hr. 58 min. Formerly the plane would take off from Miami at 7 a.m. on Tuesday, Thursday and Saturday and arrive at Cristobal at 3 p.m. the next Thursday, Saturday and Monday, respectively.

No passengers will be carried on the direct route just opened. Twice a week the planes will be sent over the old route, however, and they will carry passengers as usual. These will be the Tuesday and Thursday runs. The Saturday direct service is that which connects with the Pan American-Grace plane carrying the mail on a weekly basis down the West coast of South America to Santiago, Chile, and Buenos Aires and Montevideo.

The plane carrying the first direct-route mail was due at Lima, Peru, at 5:30 p.m. on April 29; at Arica, Chile, at 5:05 p.m. on April 30; at Santiago, Chile, at 6 p.m. on May 1; at Buenos Aires at 4 p.m. and at Montevideo at 6 p.m. on May 2. Mail for his flight started from this city on the long trip Friday, April 25.

Bandits Rob Air Mail Truck

CHICAGO (ILL.)—A truck carrying air mail between the Northwest Airways hangar at the municipal airport and the field post office at 5939 Cicero Ave., was halted on the night of April 17 by gunmen and from it were stolen five sacks, two of which contained registered mail. The mail had arrived from Milwaukee a short time before. Due to bad weather, mail from Minneapolis and Green Bay, Wis., had not been flown through to Milwaukee, and thus was automatically saved from the robbery. No results of the investigation have been announced. A similar episode occured about 5 yr. ago when a mail consignment for Hadley Field was held up in New Brunswick, N. J.

Cleveland Port Nets Profit

CLEVELAND (OHIO)—Income from Cleveland Airport for the first quarter of 1930 was more than twice the operating expense. Receipts were $22,200, and expenditures $10,176. Of the income, $15,000 represented payment by the Austin Co. for the port's three original air mail hangars, which it purchased last fall and tore down to make room for the port's largest hangar, now occupied by Stout Air Services. Normal income for the period was $7,200 and consisted of rentals from the operating companies at the field. Total income for 1930 is expected to be $48,000. The expense budget for the year is set at $34,615, which makes income and operating expenses actually about even.

AIRPORT CONSTRUCTION PROJECTS

Central

AT BELLEVILLE, NEB., a $1,000,000 airport development is being planned for a 420-acre site located 9 mi. from Omaha and 12 mi. from Council Bluffs. Maj. Thomas G. Lanphier represents the interests controlling the development.

At the Cincinnati Municipal Airport, the ramp in front of the hangars and municipal building is to be made 100 ft. wider and increased to a length of 480 ft. An 8,000,000-cp. revolving beacon is being installed by the city on the top of Hangar No. 1.

The new 176-acre Joliet (Ill.) Airport is scheduled to be ready for use by July 1. Grading and drainage have been contracted for at a cost of $63,924, but all bids for the hangar exceeded the budget allowance, and have been rejected.

Grading work has begun at the St. Louis Municipal Airport preparatory to construction of concrete drives, walks, and a parking area in the rear of hangars on the west side of the field.

East

Lawrence, Mass., has decided to purchase a 250-acre tract at North Andover for a municipal airport, provided there are no legal impediments. The site has a frontage of 700 ft. on a street, and skirts the Merrimac River and the Boston & Maine Railroad tracks.

At the Boston Municipal Airport, a lunchroom will be established in the new administration building by Henry T. Sanborn. The contract calls for furnishings and equipment costing $18,000, and a rental for eight years totaling $25,000, on a graduated yearly basis.

The Municipal Airport of Danville, Va., has been leased by the Dixie Flying Service Co., Inc. The city will build an $8,000 hangar and shop building.

Springfield (Mass.) Airport is installing an asphalt apron about 90 ft. wide which will run 800 ft. along the westerly edge of the field.

The Jersey City (N. J.) Airport at Doyer's Point will be extensively developed by a new airport corporation, headed by Clarence Chamberlin.

South

Work on the Victoria (Tex.) Airport is reported to be under way. The Department of Commerce has contracted with J. W. Kimbrough for leveling the land, laying of 1,600 ft. of drain tile, fencing of the field, and construction of a wooden bridge to connect the airport with the highway, at an expenditure of about $3,000.

A 215-acre site at Miami, Fla., is being developed by All American Airways, Inc., as an airport. Plans include an administration building, a reinforced concrete hangar, depot, and runways.

The steel hangar at the Hattiesburg (Miss.) Airport is reported to be nearly completed.

Approximately 500 acres in Uvalde, Tex., have been acquired for use as an airport by the newly organized Uvalde-Del Rio-Eagle Pass Flying Service, Inc.

The Knoxville (Tenn.) City Engineering Department is completing plans for an $18,000 hangar for the McGhee Tyson Airport and will shortly call for bids.

The Eureka Springs (Ark.) Chamber of Commerce is reported to have secured an option on a tract of land about 4 mi. from the city, which it will develop as an airport.

The emergency landing field at San Benito, Tex., has been leveled, and lighting equipment is to be installed soon. The contract for the pipe work has been awarded to Agar & Gentry.

Ritcher Airport, Kirbyville, Tex., is being leveled and drained and a wind cone is being installed. It is planned to open the port officially soon.

Work has begun on the new Meridian (Miss.) Municipal Airport for which a $75,000 bond issue was voted at a special election.

At Anahuac, Tex., an airport which will have 2,000 ft. runway in all directions is being established.

At the emergency field at Peoria, Tex., boundary lights have been installed.

West

Grading is in progress at the Cheyenne (Wyo.) Municipal Airport, and represents the first step in carrying out the $3,200 program recently voted by the City Council. Other items in the plan are moving the line of lights slightly inward along the east side of the field, and installing a completely equipped hospital ambulance.

Alameda Airport, Inc., of Alameda, Calif., has awarded a $100,000 contract for the construction of a steel frame hangar, 120 x 450 ft., to Lindgren & Swinerton, Inc., of San Francisco.

It is planned to enlarge Lindbergh Field, San Diego, Calif., by acquiring and filling in additional acreage between the present field and the marine base.

The Baker (Ore.) post of the American Legion has taken a 10-yr. lease from the state land board of 95 acres which it will develop as an airport.

All hangar bids for the Yuma (Ariz.) Airport have been rejected, it is announced by the county engineer, and new bids will be taken at once.

The Hanford (Calif.) City Council has awarded the contract for erection of a pumphouse at the municipal airport to Brown & Hougham.

Boeing Field, Seattle, has recently added 2,000 sq.yd. of pavement at the front entrance of the administration building.

At the Carlsbad (N. M.) Airport, the New Mexico Airways is about to begin the construction of a two-plane hangar.

St. Louis-New Orleans Passenger Line Opened

MEMPHIS (TENN.)—Robertson Airplane Service Co. inaugurated daily passenger service April 27 between St. Louis and New Orleans, via Memphis and Jackson, Miss. Six-place Ryans, powered with Wright 300 hp. Whirlwinds, will be used temporarily until six Curtiss Kingbirds are delivered.

The schedule is as follows:

Southbound		Northbound
Lv. 11:30 a.m.	St. Louis.	Ar. 4 p.m.
Ar. 2 p.m.	Memphis	Lv. 1:30 p.m.
Lv. 2:15 p.m.	Memphis	Ar. 1:15 p.m.
Ar. 4:10 p.m.	Jackson, Miss.	Lv. 11:45 a.m.
Lv. 4:15 p.m.	Jackson, Miss.	Ar. 11:40 a.m.
Ar. 5:50 p.m.	New Orleans	Lv. 10:12 a.m.

Fares will be: St. Louis to Memphis, $20; Memphis to New Orleans, $25.

Passengers on the initial flight were Frank Robertson, president of Robertson Airplane Service Co.; Bud Gurney, operating manager; and Pilots Joe Reid and Dan Robertson. Only the southbound flight was made Sunday.

The service will be extended to Chicago eventually, according to plans announced by Maj. William B. Robertson, vice-president. For the present, the line will tie in with Illinois Central Railroad system between St. Louis and Chicago.

Backers of the Robertsons in the project are Harold M. Bixby, Harry H. Knight and Phil Ball.

United Wins N.A.T.

(*Continued from Page* 919)

As a by-product, United gets N.A.T.'s Chicago-Dallas service, also.

This desire reached the acute stage demonstrated by United because of its plan to launch a passenger service between New York and Chicago this summer and because of the valuable aid the Watres air mail bill promises to passenger lines in possession of air mail contracts.

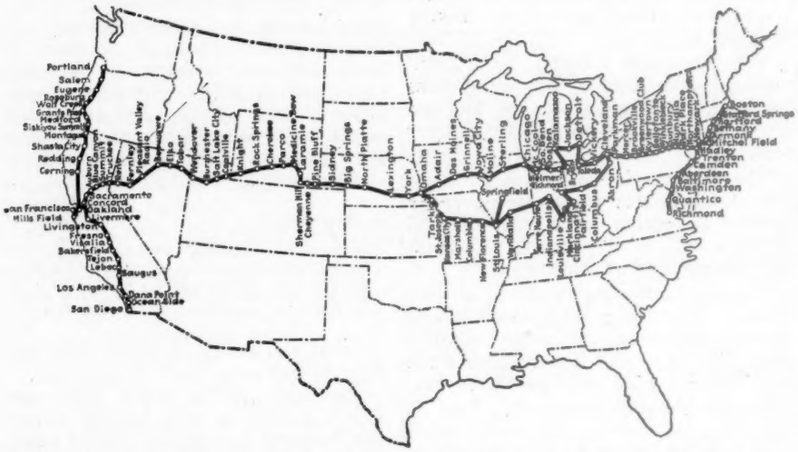
Under this new arrangement United will control the entire transcontinental air mail system, the San Francisco-Chicago section having been operated by Boeing Air Transport since 1926. The Boeing division is to inaugurate passenger service over this line on a large scale May 15.

Three Shares for One

Beside this transcontinental line, the backbone of the American air transport system, United also controls the north-south line operated between Seattle and Los Angeles by Pacific Air Transport. To this now is being added the north-south line of N.A.T. between Chicago and Dallas by way of Kansas City.

The financial arrangement between the United and N.A.T. groups was reported to be an exchange of three N.A.T. shares for one of United. The original offer, turned down by N.A.T. early in April, was three and one half N.A.T. shares for one of United Aircraft & Transport.

Teletype System Is Spreading Rapidly



THIS MAP SHOWS the teletype system installed by the Airways Division of the Department of Commerce and now in operation. The teletype has been found to be one of the most valuable aids to air navigation and the government has been aggressive in supplying the instruments at strategic points. Each instrument is rented from the American Telephone & Telegraph Co. for $40 per year. They are used for communications and for the collection of weather data on an hourly basis. It is expected that there will be a total of 5,650 mi. of teletype circuits in operation by the end of this fiscal year and a total of about 8,000 mi. by the end of the next fiscal year.

Increase in Traffic Reported by Many Lines

NEW YORK (N. Y.)—Traffic increases during the first quarter of this year have been announced by several transport companies. T.A.T.-Maddux states that the first three months showed a steady growth with 4,087 carried in March as compared with 2,736 in February. The new rates had not taken effect in time to influence notably the traffic in January.

American Airways Corp., which includes Southern Air Transport, Colonial and Universal Divisions, reports that 6,192 passengers were carried over the company's lines in March, an increase of 19.5 per cent over the volume for February. The planes were flown 312,439 mi.

During the first quarters planes of the Universal Division carried 6,031 passengers, 522 lb. of express, 61,817 lb. of mail and flew 508,036 mi. The St. Louis-Chicago mail service, originated by Robertson in 1926, was 4 yr. old April 15. During its existence it has carried more than 203,000 lb. of mail.

The volume of traffic on Stout Air Lines in the first 3 mo. of this year was 120 per cent greater than in the last 3 mo. of 1929. The mileage flown during that period increased 70 per cent over the period mentioned. The latest fare reduction was put into effect about the first of this year when the first quarter of 1930 was opening. Stout recently completed its first 1,000,000 mi. of flying without injury to a passenger, with more than 107,000 carried.

Cambas Retains Mail Route

NEW ORLEANS, (LA.)—Arthur E. Cambas, operator of the New Orleans Air Line, again has been awarded the government contract for carrying air mail from the city to Pilottown. Cambas, operator of the second oldest air mail line in the United States, was the only bidder on the route, submitting an offer of $100 for the round trip. The new contract runs for one year. New Orleans Air Line planes carry mail from steamers bound for New Orleans and deposit it in the post office here long before the vessels dock. Mail placed in the post office after steamers sail is carried to Pilottown by plane and placed aboard outgoing vessels.

N. Y. Airways to Resume Service

NEW YORK (N. Y.)—After being inactive for about a year, New York Airways, Inc., is to resume operation, about June 1, this time offering a daily service between this city and Atlantic City with at least one trip each week between here and Washington by way of Atlantic City, in place of the sightseeing trips which it operated before. Service will be resumed under the auspices of the Aviation Corporation of the Americas, which now owns the airway company entirely. The officers include: George L. Rihl, president; William H. Vanderbilt and Roland G. Thach, vice-presidents; H. Preston Morris, treasurer and secretary. The company has an exclusive arrangement for use of the Atlantic City Municipal Airport.

Three Lines Using Safety Ticket Paper

CHICAGO (ILL.)—Boeing Air Transport, Stout Air Lines and Northwest Airways are now using the safety paper developed for American Air Transport Association as the standard material for passenger tickets, it has just been announced by Winsor Williams, manager of the airline operators' group. Samples of the paper have been sent to the nineteen remaining operator-members, and adoption by those lines is expected within the near future.

The paper, which looks much like one of the varieties commonly used for bank checks, is watermarked with the new seal of the transport association. The seals are placed at right angles to one another as close together as possible, so that tickets made from the paper will bear at least one complete mark. The paper is green for one-way, gray for round trip and pink for interline tickets. Aside from the prestige which is expected to accrue through the use of standard forms and material for passenger tickets by the members of the operators' organization, the chief feature of the safety paper lies in the fact that it turns white if an attempt is made to alter printed or written markings on it.

In arranging for special ticket material, the air transport operators followed the lead set by the railroads some years ago. In fact, the rules covering its use are identical with those regarding tickets that were placed in force by the railway operators. The paper is manufactured by The George LaMonte and Son Co., 61 Broadway, New York, N. Y. This company has agreed to execute a bond in favor of American Air Transport Association, insuring sales of the ticket paper only to airlines and printers authorized to purchase it by the organization.

Authorization can be obtained solely from the association headquarters upon the request of one of the member-operators for itself or a printer. A license is then issued, and the manufacturer is notified to make deliveries to the licensee on direct order. In cases where a printer is licensed, he must account for every sheet of the paper issued to him, including any that is wasted. Sheets 28x44 in., or of any other size decided upon later by the association, are to be carried in stock by the LaMonte firm. The charge for a ream of 28x44 in. sheets is $20 net, the same price that the railroads pay for ticket material.

New York Adopts Federal Code

ALBANY (N. Y.)—With Governor Roosevelt's signature, the Webb bill, providing for conformity with Department of Commerce recommendations, has been written into the New York State air traffic laws. It will go into effect July 1, 1930, making violation of the regulations a misdemeanor. It was introduced by State Senator Webb, on behalf of the state aviation commission.

Airway Briefs

United States Airways was scheduled to begin operation of its Oklahoma City-Denver line April 28. This connects with the company's Kansas City-Denver line at Hays, Kan.

Bond ordinances have been drawn up to provide $75,000 for the first unit of an administration building at the Wichita Municipal Airport. Aircraft Service Co., newly chartered, will build a $50,000 structure at the airport to house a repair shop.

On and after May 15, Varney Air Lines will carry passengers as well as mail.

Five positions at the county airport, Milwaukee, Wis., will be awarded on the basis of civil service examinations, to be held May 19. The manager will receive $180-$200 per month with an annual allowance of $300 for automobile service.

S.A.F.E. planes have been flown 1,000,000 mi., carrying 28,695 passengers, without an accident.

Survey of an airport site is being made for the city of Cincinnati, Ohio.

An airport directory is included in the 1930 road maps issued by the Ohio State Department of Highways.

A ruling forbidding the operation of unlicensed planes from Vancouver (B. C.) Municipal Airport went into effect May 1.

Bowling Green, Ky., has secured free use of a 30-acre tract to serve as a landing field until a municipal airport can be secured and developed.

W. P. Fuller & Co., paint manufacturers, has offered free paint to Montana towns which will use it for airmarking.

Governor Roosevelt of New York has vetoed a bill providing $25,000 for a Glenn H. Curtiss memorial airport at Hammondsport, Steuben County, following disapproval of the project by the state council of parks.

Radio station WQDQ, Menefee Field, New Orleans, owned by Gulf Coast Airways, began operation April 22.

Mason-Dixon Air Line resumed passenger service between Detroit and Cincinnati on April 25.

Coast Air Lines, Inc., has purchased the Everett (Wash.) Airport.

Albert H. Hester is in charge of a newly installed weather observation service at Love Field, Dallas.

City Council of Lincoln, Neb., has passed an ordinance providing police supervision over the municipal airport which is 5 mi. outside the city limits. Right of cities to set up such authority has been sustained by Nebraska courts.

Interstate Airlines is now operating scenic tours, including the Hermitage, the Powder Plant at Old Hickory, Tenn., the Parthenon National Cemetary, and Radnor Lake, from the company's Murphreesboro, Tenn., Sky Harbor.

Gulf Issues Aviation Atlas

PITTSBURGH (PA.) — A sixteen-page Aviation Atlas containing a considerable amount of historical data and statistics has been issued by the Gulf Refining Co., of this city. It includes: Physical maps showing all commercial air transport routes of North and South America and Europe; a world map tracing historic flights; photographs of pioneer and present day figures in the industry; a chronological review of aviation's history; statistics and charts showing comparative development in this country and abroad; a comparison of air mail and railroad time between principal cities.

Colonial Air Transport, Inc., has obtained permission from the Post Office Department to carry mail on its plane leaving Boston for New York daily at noon.

Peoples Autobus Co. has received a certificate of public convenience and necessity to operate bus service between Mills Station and Mather Field, Sacramento County, Calif.

Cedar Rapids, Ia., voters defeated a proposed $175,000 bond issue to provide for a new municipal airport.

A committee headed by Mayor John B. Rodes, Bowling Green, Ky., has been formed to consider building an airport.

A new 500-acre airport has been constructed near Uvalde, Tex., by private interests. Plans call for opening of a flying school and passenger service to Del Rio and Eagle Pass.

Strenuous objections have been raised to the proposal of City Commissioner Fabian for a five per cent tax on gross operations of aviation companies at Felts Field, Spokane, Wash., which would even include the sale of planes.

Thompson Aeronautical Corp. traffic office in Detroit has been moved to the air depot on the river front along East Jefferson Avenue.

Executive offices of Curtiss-Wright Flying Service in St. Louis have been moved to Curtiss-Steinberg Airport, near E. St. Louis, Ill.

Louisiana State Chamber of Commerce has adopted a resolution asking the creation of a commission to study and supervise airport development in the state, and a bill to create the commission will be introduced at the next session of the Legislature.

Buffalo (N. Y.) Airport Advisory Board has recommended that the city take out insurance to cover any liability incurred in the operation of the municipal airport.

Oneida Airway, Inc., has leased the Oneida (N. Y.) airport for a year.

C. Dallas, Inc., Buffalo, N. Y., and Eastern Greyhound and Lakes-to-Sea bus companies are planning a combination air and bus line between New York and Detroit. The flying would be between Buffalo and Detroit, connecting with night buses to and from New York.

Atlanta-California Lines Carry Passengers

ATLANTA (GA.)—Operations of several transport companies through the southern states now have made available a daily transcontinental passenger service between this city and the West Coast over a southern route. The companies involved in this system are Davis Air Lines, Atlanta; Delta Air Service, of Monroe, La.; Southern Air Transport Division of American Airways; Southwest Air Fast Express and Standard Air Lines.

A passenger traveling west from Atlanta would use the Davis line to Birmingham, Ala. Delta Air Service would carry him to Dallas, by way of Tuscaloosa, Ala., Jackson, Miss., Monroe and Shreveport, La. From Dallas, the passenger would take either a Southern Air Transport or S.A.F.E. plane to El Paso by way of Breckenridge, Sweet Water, Big Spring and Midland, Tex. The trip to San Diego and Los Angeles would be over Standard Air Lines by way of Hachita, N. M., Douglas, Tucson, and Phoenix, Ariz., and El Centro in southern California.

Davis a recent line

Standard and S.A.F.E. and Southern Air Transport have been operating for some time. Delta has been operating a tri-weekly service between Dallas and Birmingham and the Davis company began operations a short time ago. Delta went on a daily basis early last month, and plans to make the service twice daily, the second east-bound plane stopping at Monroe, La., for the night.

Davis recenly lowered its fares about one-quarter. The Atlanta-Birmingham flight formerly cost $15 and now is $12. The round trip costs $20. Davis plans to extend its service to Jacksonville, the planes leaving Atlanta at 9:30 and arriving at Jacksonville about 1 p.m. This will carry the above mentioned transcontinental line all the way to the Coast. In the Birmingham-Atlanta service, planes leave both cities at 8 a.m. and 4 p.m. daily, arriving at each terminal at 9:30 and 5:30 respectively. West-bound planes arrive and depart at the same hours.

U. S. Airways Extends Line

KANSAS CITY (MO.)—United States Airways, Inc., of this city, extended its Denver-Kansas City passenger service, which it has been operating for about a year on a daily basis, to St. Louis on April 20. The west-bound planes leave St. Louis at 9 a.m., arriving at Kansas City at 11:20, departing again for Denver at 11:30, Stops are made at Topeka, Salina, Hayes and Goodland in Kansas. Eastbound planes arrive in St. Louis about 5 p.m. The company also operates a twice daily service between Tulsa and Wichita.

Airport Conference Will Be Large Event

NEW YORK (N. Y.)—An elaborate program has been arranged for the annual airport conference to be held at the Hotel Statler, Buffalo, May 14-16, under the asupices of the Aeronautical Chamber of Commerce. The meetings of committees which have been studying special airport problems and the reports of these committees will feature the sessions. These committees include: accounting, hangar construction, surfacing and drainage, servicing and storage, lighting, seaplane and amphibion bases, traffic handling, concessions, sales and advertising, small town airports.

The opening luncheon will be at 12:15 p.m. on May 14. The various committees will meet during the afternoon sessions. The morning session May 15 will be given over to reports of the first five of the above-named committees. In the afternoon the balance will report. Discussions will follow each session, of course. The conference banquet will be at 7 that night. The morning of May 16 will be devoted to addresses. In the afternoon there will be an inspection of the municipal airport, followed by a buffet supper and equipment demonstrations, including lighting, also at the airport.

Speakers Named

Many items of airports equipment will be on display at the hotel during the conference. [A complete program of the event and a list of the exhibitors will appear in the next issue of AVIATION.—Ed.]

Among the speakers will be Julien L. Eysmans, vice-president of the Pennsylvania Railroad; Capt. Frank Hawks; Col. R. B. Barnitz, aviation director of Los Angeles; Col. C. O. Sherril, Cincinnati (Ohio) City manager; Maj. Frank Kennedy, Air Corps.

Consolidated Plans Fast Line

BUFFALO (N. Y.)—Negotiations are being carried out by Consolidated Aircraft Corp. for the establishment of a nation-wide system of long distance, high speed passenger transport lines using the Fleetster, it has been reported by Lawrence D. Bell, vice-president and general manager of the company. "It is probable such a route will be established this summer between New York and Chicago via Buffalo," Mr. Bell asserted.

Thompson Resumes Lake Line

DETROIT (MICH.)—Thompson Aeronautical Corp. resumed its trans-lake service April 28, using Keystone-Loening amphibions as last year. The planes leave the base at Detroit and the base at Cleveland hourly between 9 a.m. and 5 p.m., inclusive. Radio wireless will be used on the planes this year. During the 6 months of operation last year the line carried about 3,500 passengers, making an average of 60 per cent capacity per plane over the entire season.

P.A.A. to Start Venezuela Line

NEW YORK (N. Y.)—Pan American's new service to Venezuela will be started Monday, May 5. This is a weekly service and the schedule will be as follows:

Monday		Wednesday
7:30 a.m.	lv. Cristobal ar.	3:30 p.m.
12:15 p.m.	lv. Cartagena, Colombia lv.	12:30 p.m.
1:45 p.m.	lv. Barranquilla lv.	11:00 a.m.
5:00 p.m.	ar. Marcaibo lv.	7:30 a.m.
Tuesday		Tuesday
7:00 a.m.	lv. Maracaibo ar.	5:30 p.m.
10:30 a.m.	lv. Curacao lv.	3:00 p.m.
12 noon	ar. Puerto Cabello lv.	1:00 p.m.

[See AVIATION for April 26.]

Fairfax Administration Building Nearly Completed

FAIRFAX AIRPORTS, INC., has announced recently that its large brick administration building is nearing completion and will be ready for public use about June 1. This building is one of the most outstanding of the type on any of the airports in this country, involving as it does careful attention to architectural detail inside and out and a beautification plan which already includes about 8,000 tulips and 2,000 rambler roses. The building without furnishings will cost in the neighborhood of $236,000.

On the left side of the main building is the flying field. The approach from the highway is featured by the shrubbery and the mirror pool. The central part of the building is flanked on both sides with smaller buildings set at an angle to the main part. These wings in turn are flanked by one-story buildings. At the left is the new 100 x 200-ft. hangar, also of brick.

McNary Airship Bill May Get Action in May

WASHINGTON (D. C.)—Action by the Senate Commerce Committee on the McNary bill to provide for government aid in the establishment of an air transport service to aid foreign trade, has been deferred until next month. Under the terms of the bill the Postmaster General is authorized to award mail contracts to American-built airships operating in overseas trade provided that the rate of compensation shall not be more than $20 per mile. It is specified that these airships must be capable of carrying not less than 10,000 lb. of mail and a suitable commercial load a distance of 2,000 mi. without refueling.

In order to encourage the construction of trans-oceanic airships, the bill authorizes the creation of an airship construction loan and insurance fund. A committee composed of the Postmaster General and the Secretaries of War, Navy and Commerce is charged with the responsibility of advancing loans from the fund to the extent and on the terms that they think proper to citizens and organizations that agree to construct airships under the conditions prescribed.

It is provided that all airships constructed by means of the government loan must be equipped with the most modern and efficient engines and machinery obtainable. The bill permits the government to take over the airships for the national defense or during any national emergency declared by the President. Provisions carried in the measure would permit the owners of the airship to sue the United States in case they are not satisfied with the amount of money that they are awarded when their craft is taken over.

The adoption of this bill would be a great impetus to the promotion of trans-ocean airship operation, it is declared. Financial interests behind the various airship projects are said to be considerably encouraged by the prospects held out by the bill. This probably would do for the lighter-than-air department of aviation what the air mail bills have done for the airplane.

Conn. Has 66 Marked Roofs

HARTFORD (CONN.) — Forty-one Connecticut communities are provided with roof-markings for the benefit of pilots, it has been disclosed in a survey made by the Connecticut Chamber of Commerce. Altogether there are 66 signs scattered throughout the state. Bridgeport has the most with a total of seven.

T.A.C. Has Diesel Mail Plane

DETROIT (MICH.) — A Packard Diesel engine has been installed on a Stinson operated by Thompson Aeronautical Corp. and will be used on regular service between this city and Chicago with Thomas Hill as pilot. This is the first Diesel-powered mail plane.

FOREIGN ACTIVITIES

Fourteen Frenchmen Enter Light Plane Tour

PARIS (FRANCE) — Fourteen entries will represent France in this year's light plane tour, unless additional entries are made after the preliminary closing date, which was April 14. They are: two Caudron, 95 hp. Renault engine; two Albert, 95 hp. Renault and 95 hp. Salmson engines; two Dewoitine, 95 hp. Renault; two Guerchais; one Mauboussin-Peyret, 40 hp. Salmson engine; one Farman, 95 hp. Renault engine; one St. Hubert; three unspecified entries. Two entrants from foreign countries, Belgium and Czechoslovakia, are to compete under the colors of the Aero Club of France.

A sum of $8,000 has been set aside by the Air Ministry for prizes and subsidies to the French entrants. The Frenchman who stands highest in the final ranking will receive $1,200; the second, $800; third, $400; fourth, $200. If a Frenchman wins the contest, he will receive an additional $1,200. About $3,400 will be distributed among French entrants for the practical qualities of the planes, as determined in the technical tests which are part of the competition.

German Club Issues Triptiques

BERLIN (GERMANY)—German private pilots will hereafter be able to obtain triptiques, or custom control certificates, from the German Aero Club for a fee amounting to only about $10-$15 for the average sport plane. These triptiques allow the pilot to take his plane from one country to another with a minimum of formality, and provide the necessary bond that it will be brought back to Germany, and so not be subject to customs duty. For double fee, triptiques may be obtained which can be used any number of times within a year from date of issue. Belgium, France, Great Britain, Italy, Japan, Netherlands, Rumania, Switzerland, and Chechoslovakia are parties to the International Air Triptique Agreement which was signed by the Aero Club of Germany July, 1929.

Polish Air Budget Passed

WARSAW (POLAND) — The 1930-31 aviation budget, which has been passed by parliament, contains the following items: Military aviation, $2,454,000; Civil aviation, $932,000; total, including miscellaneous items, $4,000,000. In the military budget, about $38,000 is included for development of ballooning. Air transport subsidies, included with civil aviation, will amount to about $674,000, and the rest will be devoted to airports, buildings, and research.

Caproni Buys Plant in Bulgaria

SOFIA (BULGARIA)—Acquisition of an aircraft factory at Kazanlik by the Italian Caproni company has been reported here. The factory was built by a Czechoslovakian firm. At the same time, it is reported that the Caproni company has been granted an exclusive contract for supply of airplanes to the Bulgarian government, and it is assumed that the newly acquired factory will be used for this purpose.

Foreign Briefs

Bureau Veritas reports that there were 939 non-military planes in operation in France Jan. 1, 1930.

A French air tour commission has been created by decree of the Air Minister, to aid and encourage private fiying.

Civil airplane licenses are held by 92 pilots in India.

Great Britain and Germany have made a reciprocal agreement for recognition of airworthiness certificates.

Air-Union (French) carried 17,069 passengers and 2,182,315 lb. of freight in 1929, as compared with 11,806 passengers and 964,825 lb. of freight in 1928.

All aircraft operating in Mexico must carry white headlights and tail light, as well as red and green side lights, according to regulations recently promulgated by the department of aviation.

Express rates on Corporacion Aeronautica de Transportes lines (Mexico) have been reduced 25 per cent.

Arrangements for exchange of air mail between Mexico and Cuba, San Salvador, Honduras, Nicaragua, Costa Rica, Panama, Colombia, Ecuador, Peru, Bolivia, Chile, Argentina and Paraguay were scheduled to go into effect May 1.

Recent reports state that 22 per cent of the French military budget, 17.4 per cent of the British, and 14.3 per cent of the Italian, are devoted to aviation. Folowing are present milages of air lines: Germany, 22,938; England, 7,250; Russia, 11,531; France, 17,859; Italy, 7,758.

Preliminary tests of a tail-less rocket plane piloted by Gottfried Espenlaub at Dusseldorf were reported as successful.

The late Comte Henri de la Vaulx has been cited to the French Order of the Nation.

It is reported that American aviation interests and a group of Chinese Government officials have formed a joint company to manufacture airplanes in China.

Plan Graf Zeppelin Trans-Atlantic Schedule

FRIEDRICHSHAFEN (GERMANY) —May 18 has been set as the date for departure of the Graf Zeppelin for South America and the United States. No definite schedule will be arranged, but it is anticipated that arrival at Lakehurst will be about June 1. Passengers will be booked by the Hamburg-American Line, with the fare set at $6,500 for the round trip. Other fares will be $2,500 to Pernambuco; $2,750 from Rio de Janeiro to Lakehurst; $2,000 from Lakehurst to Seville; $2,250 from Lakehurst to Friedrichshafen.

According to present plans, about 24 hr. will be taken for the flight from this city to Seville, and after one day's delay, the trip to South America should occupy three or four days. Tentative route will be via Madeira, Canary Islands, and Cape Verde. If the weather in South America is unfavorable, landing will be made at Pernambuco; otherwise the flight will continue direct to Rio de Janeiro. About 20 hr. should be required for the next leg, from Rio de Janeiro to Pernambuco, where a stop of two or three days will be made. From Pernambuco to Havana will take about three days, and from Havana to Lakehurst, 24 hr. After a three-day interval, the airship will start the three-day journey to Seville, and continue directly back to the hangar here. Passengers will be required to sign a contract guaranteeing that they will not publish articles about the trip within two weeks after it ends.

Announce German Air Budget

BERLIN (GERMANY)—In the budget now under consideration by the Reichstag, about ten million dollars is asked for aviation subsidies. Of this amount, about $4.750,000 is destined for Luft Hansa, $4,000,000 for European operations and the rest for development of non-European services. As reported by the U. S. Department of Commerce representative, $500,000 will be required to cover the deficit incurred by the company last year. It is anticipated that $3,125,000 will be awarded to the Federal Association of the German Aeronautic Industry, $775,000 for airship construction, $660,000 to pay for the new Zeppelin hangar, $575,000 for training of commercial pilots, and $400,000 for the Aeronautical Testing Institute. Most of the rest will go to ground organization, research, and safety development, with only about $75.000 available for encouragement of gliding activities.

SIDE SLIPS

By
Robert R. Osborn

WE READ in the news that some one is proposing to one of the towns on Long Island that it develop some of its public land as an airport with a golf course adjoining. Having witnessed the interesting fight between Roosevelt Field and the golf course adjoining it, we'd suggest that the designer of this new proposed course make his outlay so rough and adorned with trees that it won't be the best spot in the neighborhood for pilots to indulge in forced landings.

• • •

Below is another news item which convinces us that the Boling System pilots must be a tough and hard-boiled crew. A few weeks ago we printed that other story relating how they had to use a steel trace chain for a wind sock on most of the Boling lines.

"Those who associate air mail piloting with occasional parachute jumps are contradicted in a statement made today by Mr. K. K. Knickerbocker, Chicago representative for Boling system, that in 8,000,000 miles of flying over the San Francisco-Chicago and Los Angeles-Seattle routes with mail and passengers, no Boling pilot has ever gone over the side or used a parachute in a jump."

• • •

Mr. E. R. S. of Wilkinsburg, Pa., clipped the following from the Pittsburgh *Sun-Telegraph* of February 2.

"Sails 3,000 feet — Lieut. Ralph Barnaby's small glider just as it was released over Lakehurst from the dirigible Los Angeles at a height of $3,000 feet. The glider landed perfectly after soaring eight minutes."

If we must be accused of sordid commercialism in everything we do why not credit Lt. Barnaby with a soaring record of $8 minutes?

• • •

The news comes from Boston that discarded parachutes are very much in demand, as they can be made into very nice silk mufflers and handkerchiefs. You may remember that Fred Becker, of Roosevelt Field, N. Y., discovered that if a motor was good for nothing else it could always be dropped overboard and used as a mooring for a flying boat. With this rapid progress it shouldn't be long before our used material problem is completely solved. Then we can start on the problem of finding a use for the new planes and motors in our warehouses.

• • •

The following item from the New York *Times* was sent in, with a protest, by H. F. P.:

"A shipment of eight bats came out of the sky for Babe Ruth during the Yankee practice session at Crescent Lake Park this morning. They were chaperoned by no less than the President of the Yankees himself, Colonel Jacob Ruppert. The junior blimp 'Vigilante' which *broods* over the practice field nearly every day stooped to earth and made a landing in left field. Men with ropes dragged it until its cabin was near the pitcher's box, where Colonel Ruppert disembarked, closely followed by the bats."

The protest deals with the use of the word "broods" as Mr. H. F. P. thinks that "Happy Days Are Here Again,"—that this aircraft business outlook is much brighter now, and therefore "broods" isn't quite the word.

Possibly this isn't just the right word to apply to aeronautics in general just now, but we know of at least one day when it could very properly be applied to that ship, or its crew. The pilot was attempting to visit one of the eastern fields and he would bring his craft down just off the ground with the motor and would then try to convince some mechanics to hold it down with the drag ropes. However, it was a nice warm day with no business to bother anyone, and all of the mechanics were soundly sleeping under the wings of the parked ships. They weren't interested in blimps or anything else, and after an afternoon's work attempting to land without valving gas, the pilot was not only brooding over the field but he expressed his opinion of it in clear understandable language, before returning to his home field.

• • •

Miss H.L. of Torreon, Coahuila, Mexico, who appeared in this space a few weeks ago with some sort of talk about tail winds and bent fuselage members, and who was therefore placed on the suspicious list, writes in in her own defense: "Before I came to Mexico I didn't believe in tail winds either. In fact, I had a strong suspicion that, should a pilot step out of his ship and say, 'I caught a tail wind,' and the Department of Commerce hear of it, his license would be permanently revoked. However, if you will get any authentic work on meteorology you will find that winds run in a sort of pulley belt arrangement, and that tail winds are simply head winds coming back. Further, you will find that the headwind part of the pulley belt runs across the United States, but that the tail wind part runs across Mexico. You are right about pilots bending fuselage members,—in fact, that is what I told you he did,—with his head."

Well, if Miss H.L. is to be believed, and we are still a bit dubious about that, the mystery of what becomes of al of the nice tail winds is at least partially solved. Mexico seems to be a silly place to have all of the tail winds too, so we suggest that all AVIATION readers write in to their Congressmen demanding some tail winds for the United States. We suggest that Mr. Stimson and his cohorts be sent down to Mexico to arbitrate the matter on a complete parity basis.

• • •

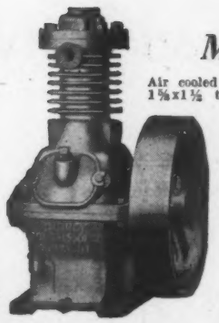
Mr. R.R.S. of Alva, Okla., clipped an item from the *Wichita Beacon* which described flying conditions in Alaska: "Over all of these routes Crosson seldom relies on a compass. And most of his flights are made at night. At 3,000 feet elevation, flying in any direction, the sun shines in his face, while on the ground relative darkness covers all."

What does Miss H.L. of Mexico have to say about this? In Alaska they apparently not only have head winds all of the time, but the sun shining in their faces. There's where men are men in the flying game, and the flying Northwest Mounted Police must have to be supermen to always get their man. By comparison, flying in Mexico must be like retiring on a rich legacy.

• • •

Mr. R.S.K. of Paterson, N. J., mails us a copy of a letter recently received by his company: "Dear Sir: I am trying to invent something on an aeroplane and would like to have some information from you. It is, to keep the aeroplane in the air for a certain length of time after the gasoline is finished, and to do this I must look at all parts of an aeroplane. Please let me know if I have to have a permit or what must I do to do this?"

This is indeed a worthwhile ambition and we hope that Mr. R.S.K. has arranged for the gentleman to see all parts of an aeroplane. As a spur to his imagination and inventive powers he might also be shown parts of an airplane which didn't stay in the air for a certain length of time after the gasoline was finished.



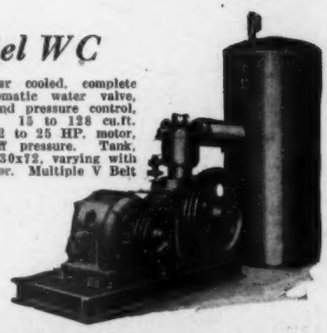
Model A

Air cooled and made in sizes from 1⅝x1½ to 4½x5. Displacements from 1 cu.ft. to 27 cu.ft., depending upon size of compressor, and motor used.

Furnished also with tight and loose pulleys, if desired, or with V type pulley.

Model WC

Automatic, water cooled, complete unit with automatic water valve, motor starter and pressure control, for heavy duty. 15 to 128 cu.ft. displacements; 2 to 25 HP. motor, 150 lb. cut off pressure. Tank, 18x72, 24x72, 30x72, varying with size of compressor. Multiple V Belt drive.



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To Airport Operators and Airplane Manufacturers who are "up" on compressors, "Quincy" stands for "Quality"—a high standard of quality that begins at the very foundation—the design.

Quincy design is of such a character that Quincy operation is noticeably quiet—so quiet that you realize at once that here is perfection.

And that realization is confirmed and re-confirmed throughout the whole long life of the compressor; for high efficiency and low maintenance cost extend far beyond your fondest expectations. That is why the Quincy warrant of absolute satisfaction is unlimited.

For paint and dope spraying, operating pneumatic tools and lifts, for spray cleaning engines, blowing out gas and oil lines, inflating tires—get a Quincy for real economy.

Write for complete information, or send the coupon at right.

N1050

Model PX
Paint Spraying Unit

A compact, portable three-wheel unit. Complete, ready to operate paint spray equipment. Has 20-gal. tank, pressure gauge, safety valve and drain cock; also suction unloader to maintain operating pressure of 80 lbs., which may be adjusted for any suitable pressure up to 100 lbs. The air filter is warranted by maker to be 99.9% efficient. Sizes 2½x2½ and 3x3½. Displacements 4.2, 6 and 8.6 cu.ft., depending upon size of motor.

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208 Maine St., Quincy, Ill.

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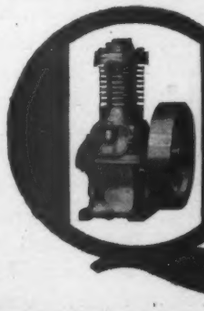

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Pan American Airways System

Greatest Air Transportation Line in the World— Linking North America with 83% of Latin America's Population

Pan American Airways System was organized for the purpose of connecting North, Central and South America by a reliable, regular and safe transportation system for mail, passengers and express. At the beginning it was realized that, to be of real service in creating good-will among these 27 countries, as well as building up commerce and industry, this system must reach more than merely the seaport towns. With this in mind a program was set forth which welded into one great system the groups of aviation, railroad, steamship and government interests with the determination that both passengers and mail could move on schedule with speed and comfort from New York, Chicago, Detroit, St. Louis, Los Angeles, Boston, Washington, etc., to the principal cities in Uruguay, Argentine, Chile, Mexico, Guatemala, Panama, West Indies, north-east coast of South America, etc.

In 1927 the first part of the system was opened — Key West-Havana, later extended from Miami to Havana. Havana found itself connected through the airline with all the principal points in the United States by means of direct rail connections at Miami for passengers and by means of domestic airlines for mail. In 2½ years Pan American Airways extended its system — and therefore the systems of the United States railroads and domestic airlines over 15,000 miles of established airways throughout Latin America.

Seven Days From New York to Buenos Aires

Just a week ago Pan American Airways System, in conjunction with its domestic air mail associates, inaugurated the seven day air mail schedule from New York and Chicago to Buenos Aires. This schedule has been made possible by speeding up domestic air schedules through the aid of night flying; the establishment of a new and direct route across the Caribbean from Miami to Panama by Pan American Airways (longest scheduled over ocean flight in the world); and by improvement of ground facilities by Pan American Airways System in South America to such an extent that two days are cut off from Panama to Buenos Aires. None of this was done or even considered until one year of operation had shown an efficiency of better than 99 per cent.

A most important fact is that in following the shortest route to Buenos Aires, namely, across the Caribbean, down the west coast of South America and across the Andes to Argentine and Uruguay (which is the route followed by All America Cables, Inc.), more than seventy-five per cent. of the South American population is served. With the other Pan American lines through Central America, Mexico, the West Indies and the north coast of South America, more than 83 per cent. of the Latin American population is served.

Mail Contracts Aid Development

The entire service has been made possible under the U. S. Post Office contracts whereby mail is carried by the domestic air mail contractor to Miami, Florida, or Brownsville, Texas, where it is delivered to Pan American Airways, Inc. The U. S. Post Office pays Pan American Airways for every mile it flies on mail schedule from the U. S. borders to the farthest points in South America, namely, Buenos Aires and Montevideo, and return. The United States Foreign air mail contracts require Pan American Airways System to assign a certain amount of space in its planes for the transportation of mails both from the U. S. to foreign countries and from foreign countries to the U. S. All revenues received from foreign governments for movement of mail to the U. S. or its territories are therefore for the account of the United States Post Office Department.

Col. Charles A. Lindbergh, Technical Advisor of Pan American Airways, not only laid out the majority of the air routes but has himself made first scheduled flights on most of the extensions over which now regular passenger and mail planes fly in a year better than 4,500,000 miles. The airways have been perfected to the point where at present there are over 71 airports, and 30 radio stations established and operating successfully. Policies have been worked out and established to such a degree that it has been possible to maintain a schedule and operate planes giving a safe, economic and dependable service. It is the policy that every pilot shall have flown at least 2,000 hours, which is equal to 8½ times around the world, before he is accepted for service. He is then further trained on take-offs, landings, flights, observance of regulations and use of radio for weather and general control.

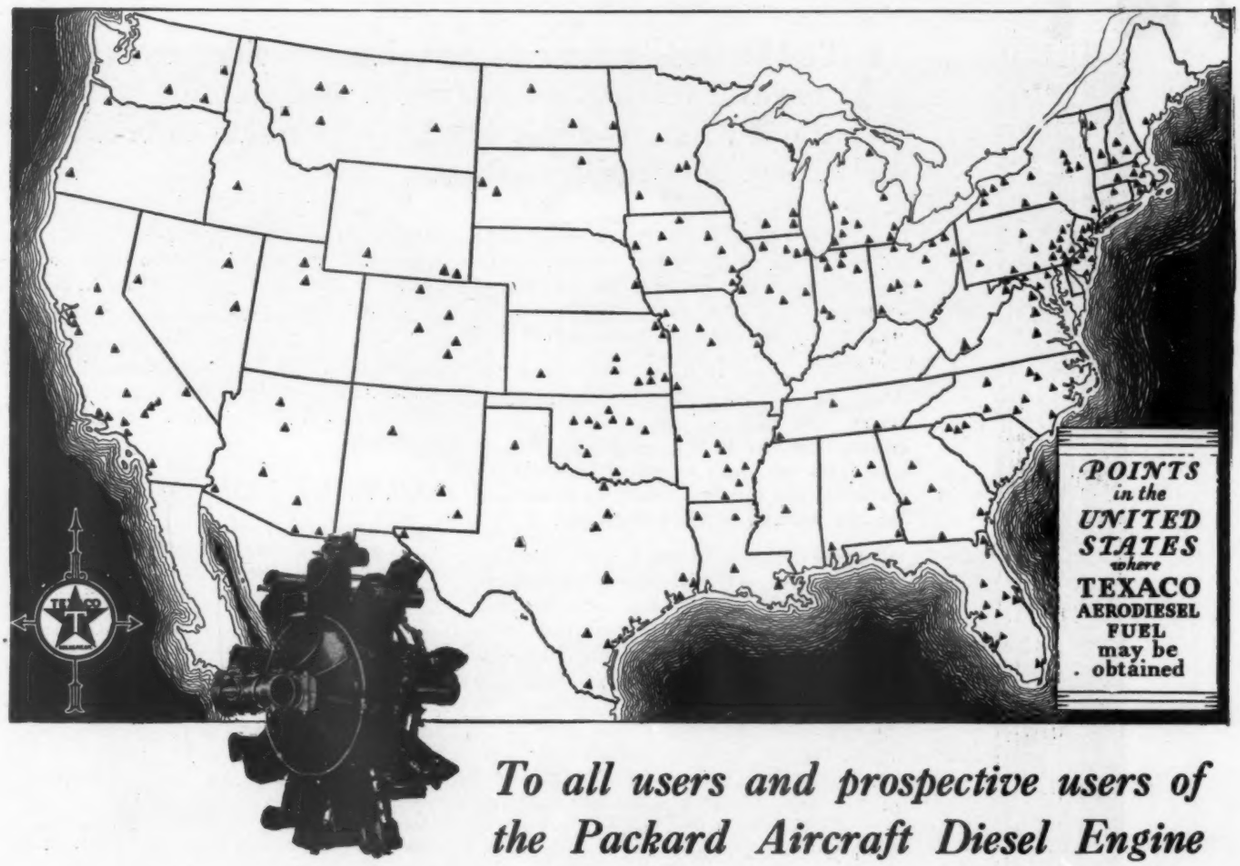
More Than an Air Line

The Pan American system has arrangements with established connecting transportation companies so that through tickets can be purchased at the principal railroad ticket offices. Tourists and business men may travel between any cities in United States to the principal cities in Mexico, West Indies, Central and South America, or reverse.

The result is not merely an air line, but a great transportation system coordinating the long established means of travel with aviation for the development of commerce and better understanding among the peoples of the Western Hemisphere.

Announcing national distribution for

TEXACO AERODIESEL FUEL



To all users and prospective users of the Packard Aircraft Diesel Engine

***The* Texas Company has arranged a coast-to-coast distribution of TEXACO AERODIESEL FUEL. This highly effective fuel for the Packard Aircraft Diesel Engine is now conveniently available at, or near, three hundred of the principal airports of the country. As the use of the aircraft Diesel increases, the distribution of TEXACO AERODIESEL FUEL will be extended to include every important flying field in the United States. The unparalleled chain of Texaco wholesale stations in each of our 48 States has made this possible. • Special arrangements for adequate fuel supplies, where necessary, will gladly be made for pilots advising The Texas Company in advance of proposed new routes. Write, or 'phone The Texas Company.**

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ANNOUNCING

A TRIM little open-cockpit, side-by-side, two-seater parasol monoplane for sport and training . . . can be parked in the average garage . . . made to order for the largest developed market!

"Give me a plane that I can sell to the largest group of developed prospects—the private owner, the average chap who knows little about aviation except that he has the 'bug' to fly and the money to satisfy the inclination!"

That has long been the cry of prospective dealers and distributors, who see a large dormant market that can be cracked wide open with the right technical approach—a market which can be soundly merchandised like that offered by the automobile.

When the designers of the E.A.C.1 (nationally-known experts, by the way) set out to fit a plane to this market, they visioned hundreds of men who are air enthusiasts by inclination and automotive merchandisers by training. They saw these men sitting on the side lines waiting for aviation to "develop." They knew these men were anxious to get going, willing to do their part and get behind a real plane that would hit the bull's-eye of public approval—one that would be built to meet the demands of the largest possible group of buyers.

The sponsors of the E.A.C.1 know that dealers and distributors can't live on hopes and skimmed milk. And that while it is easy to put planes in on the floor, it is quite something else again to move them out in sufficient volume to pay rent and overhead and still leave a profit.

That's why the E.A.C.1 is getting a big reception. It's the safest, neatest little monoplane that ever came out of any factory. *And it is technically perfect from tip to tail.*

LOOK AT THE FEATURES!

Highest factor of safety . . . sharply swept back wings provide automatic stability . . . maximum visibility in all directions . . . wings braced internally by chrome molybdenum steel tubing—no wires or turnbuckles to loosen. Windows at all control connections for quick inspection.

Side by side seating in a roomy cockpit; you fly as you drive. Chummy for sport use, best for training.

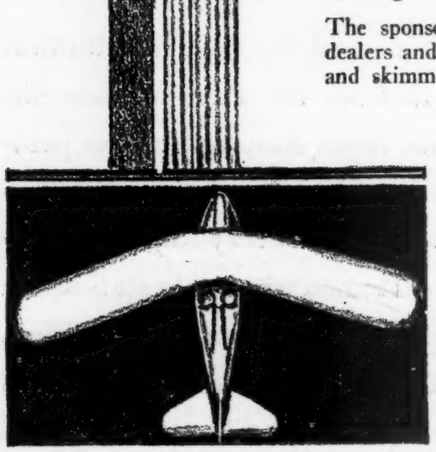
Can be housed in the average garage. Wings quickly folded to fit in a space 20 x 11 ft. Foolproof locking device.

Powered by a Wright-Gipsy motor, 90-100 hp. Metal propeller.

Musselman Airwheels—only shock absorbing element, giving a neat, trim appearance. Army tests show their superiority.

A great "eye appeal" . . . carefully streamlined . . . choice of *seven* color combinations.

Price $3,800 to $5,000, depending upon equipment.



UNUSUALLY SAFE!

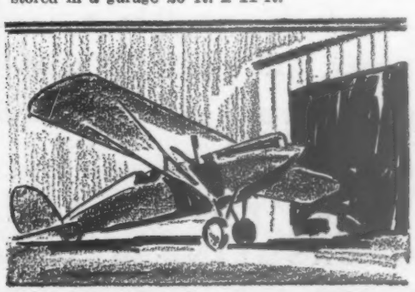
Sharply swept back wings provide inherent automatic stability. Has a load factor of ten, which exceeds by far the requirements of the Department of Commerce.

The Engineers Aircraft Corporation

Stamford, Connecticut

HOUSED IN A GARAGE!

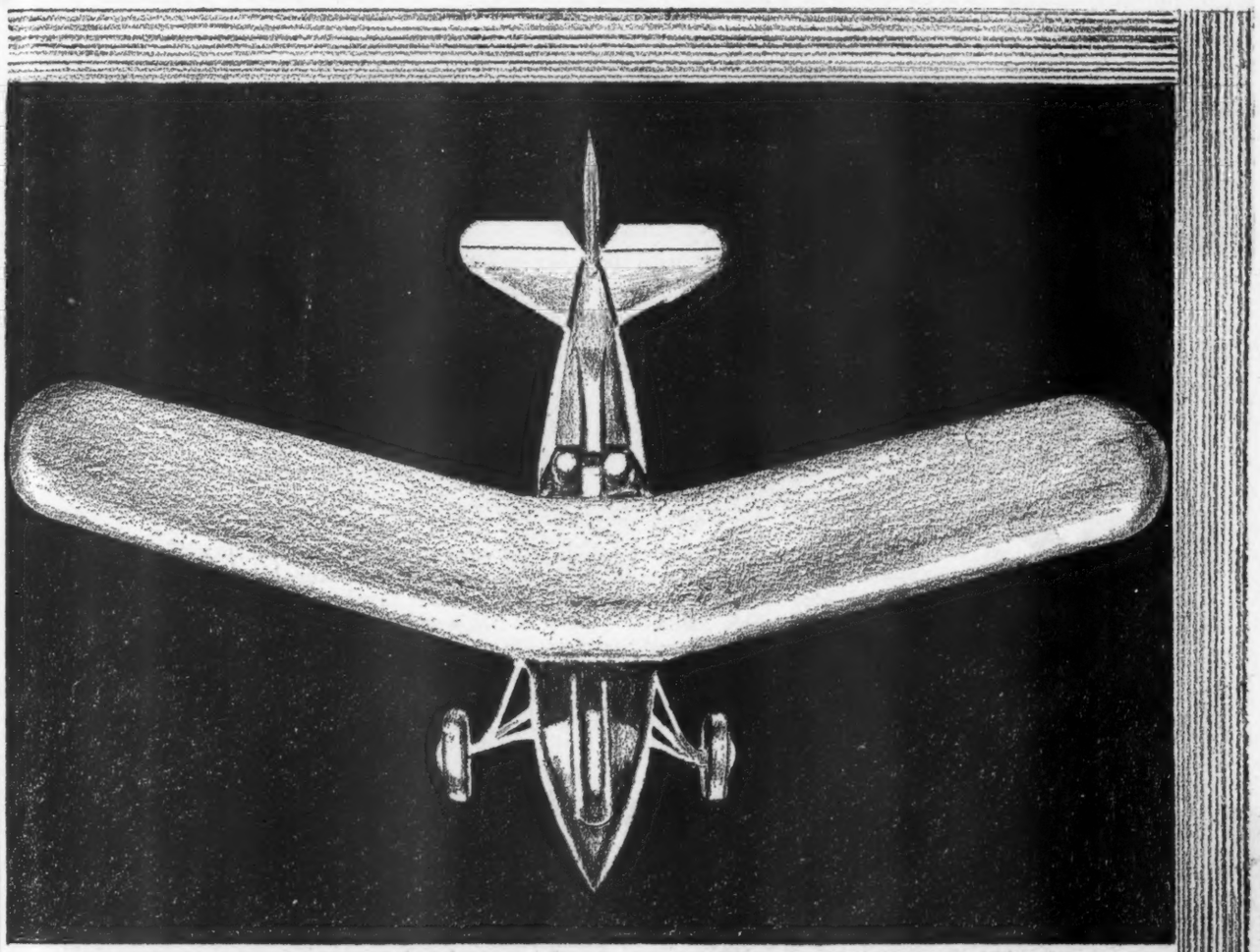
Wings fold back so that entire plane can be stored in a garage 20 ft. x 11-ft.



SIDE BY SIDE SEATING

You fly the way you ride, side by side. Best for sport use, ideal for training.

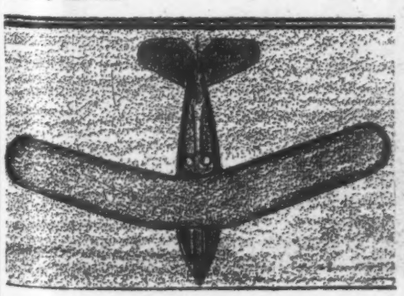
..THE TAG



EXHIBITING AT THE NEW YORK AIRCRAFT SALON

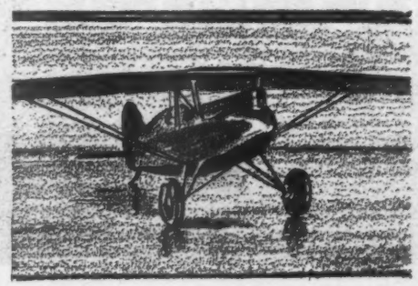
CAREFULLY STREAMLINED

A glance shows the careful designing that gives a trim, speedy appearance with provision for utmost visibility in every direction.



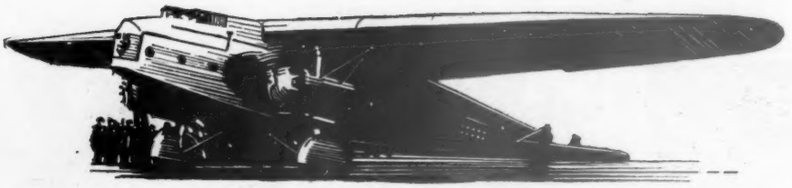
MUSSELMAN AIRWHEELS

Musselman Airwheels improve appearance and reduce maintenance by eliminating outside shock absorbing devices. Comprehensive tests show Airwheels most efficient, by far, for this type of plane.



CHOICE OF 7 COLORS

Seven distinctive color combinations give customer chance to exercise personal preference.



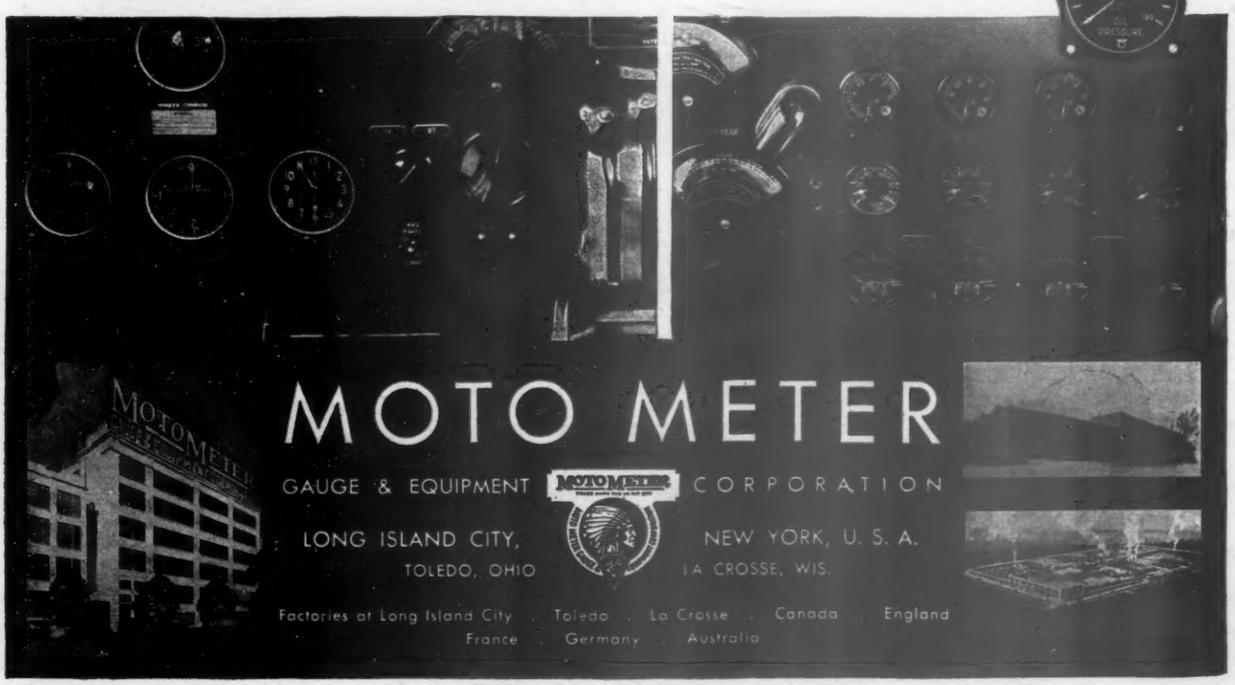
A view of the nose of the ship, showing how the temperature - sensitive element of the Ice Warning Indicator is installed.

HOW THE WESTERN AIR EXPRESS INSURES SAFETY

THE huge new 32-passenger air liners of the Western Air Express are all equipped with Moto Meter Ice Warning Indicators. These beautiful and safe Fokker F-32's are the largest land planes ever built in America. The fleets of many other air transport companies also use Moto Meter Ice Warning Indicators. They take no chances with the big investment modern ships represent and with the precious human freight intrusted to them. For, of all the dangers that beset the pilot, ice forming on the wings is one of the most insidious. And to avoid ice the pilot must know exactly when the outside temperature has reached the critical point, where, if the atmosphere is saturated, ice is likely to form. The Moto Meter Ice Warning Indicator gives him exactly that knowledge. Its clear dial is connected with a sensitive feeler on the nose of the ship that instantly reacts to every change of outside temperature.

The name MOTO METER on this indicator is your guarantee of excellence and absolute trustworthiness. Moto Meter is one of the largest manufacturers of high grade instruments in the world. Besides the ice warning indicator Moto Meter also produces a number of other dependable and reasonable aviation instruments, such as heat indicators, oil and fuel pressure gauges, many of which are found on popular makes of planes, and many of which have done their part in making possible the record-breaking flights of recent years. Find out what these instruments can do for you. Write for free booklet, "Aviation Instruments", *today*.

Below is a view of the instrument board in one of the new Western Air Express liners. The dial of the Ice Indicator is in the lower left hand corner. No less than eight Moto Meter Oil and Fuel Gauges are visible on the right side of the panel.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GAUGE & EQUIPMENT
MOTO METER
CORPORATION
LONG ISLAND CITY,
TOLEDO, OHIO
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LA CROSSE, WIS.
Factories at Long Island City . Toledo . La Crosse . Canada . England
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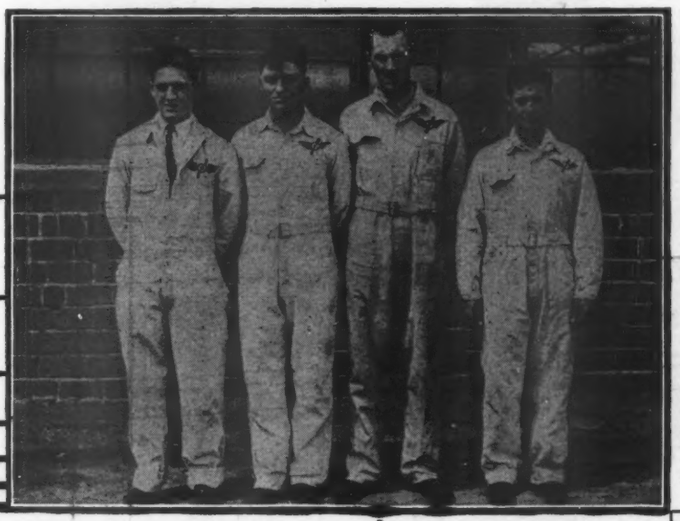
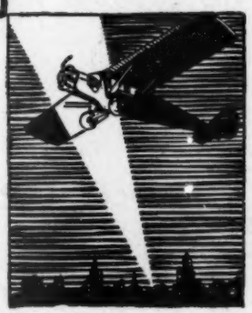
Above All – Parks Training is Thorough *and* Sincere



Four graduates of the Parks Air College Airplane Engine Mechanics' School who are now employed in the factory of the Lockheed Aircraft Division of the Detroit Aircraft Corporation at Burbank, Calif.
Left to right, they are—H. L. Gammill, S. H. Reichert, Hugo Carlson, and L. H. Larivee.



WHEN you decide to make aviation your life work—whether as a pilot or as an airplane and engine mechanic—the first thing to consider is, "Where can I get the training which will mean *sure success* to me?"

Think *first* of Parks—the finest and most complete commercial aviation school in the country—one of the first to be licensed and approved by the Department of Commerce.

Parks training has fitted many men for responsible jobs in the aviation industry—as pilots, airport executives and mechanics.

Sincerity and thoroughness are the hallmarks of PARKS training. Every course is under the personal supervision of Oliver L. Parks. Every instructor is licensed by the United States—a man of proven character and ability. And before the eyes of every man is kept constantly the fact that Parks Air College has a mission—that its superior experience and resources impose upon it the moral obligation of giving its students the finest possible training—that to it the aviation industry is looking as the progressive leader of the field of aeronautical instruction.

A group of Parks Air College instructors.

A fleet of more than thirty training planes—a half-million-dollar plant—a location unexcelled by any in the country—a variety of training courses to suit your own needs—Parks offers these to you.

Join the ranks of successful Parks graduates. It will reward you with superior training. The coupon will bring you full details.

Parks Air College was one of the first to be licensed by the U. S. Department of Commerce as a fully accredited transport school.

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DIVISION OF DETROIT AIRCRAFT CORPORATION

583 Missouri Theatre Building

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COUPON

PARKS AIR COLLEGE,
583 Missouri Theatre Building, St. Louis, Missouri

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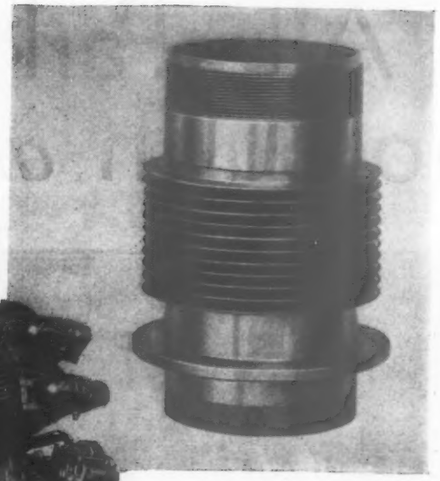
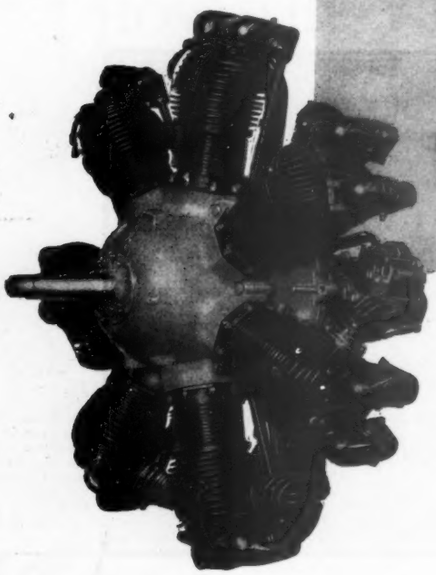
I am interested in Pilot's Course ☐ Mechanic's Course ☐



Upper right view shows Nickel Alloy Steel cylinder used in Axelson Type B 150 H P airplane engine, manufactured by AXELSON AIRCRAFT ENGINE CO., *subsidiary of the Axelson Mfg. Co., Ltd., Los Angeles, Calif.*



Dependable materials are the best assurance of dependable performance

Nickel Alloy Steel Parts in AXELSON Aircraft Engine

Cylinders Cam
Cam countershaft
Valve tappet Cam roller pin
Rocker arms
Rocker arm shafts
Fuel pump drive shaft
Oil pump drive shaft
Oil pressure pump drive gear
Oil pressure pump driven gear
Scavenging pump drive gear
Shaft for oil pump driven gear
Magneto drive shaft
Starter clutch Knuckle pin
Piston pins

17 PARTS

of tough NICKEL ALLOY STEEL *insure dependability in Axelson Aircraft Engines*

THE wide experience of the Axelson Manufacturing Co. in producing precision equipment has proved to be of great value in designing and constructing the Axelson type B aircraft engine. This 150 H P engine was awarded the Department of Commerce Approved Certificate No. 16, and is known for its dependable power and economical operation.

The fact that the cylinders in Axelson engines are ground and machined from a forging of heat-treated Nickel Chromium Steel indicates that careful selection of materials is a major consideration with Axelson engineers and designers. Seventeen additional vital parts of Axelson engines are also made of Nickel Alloy Steel.

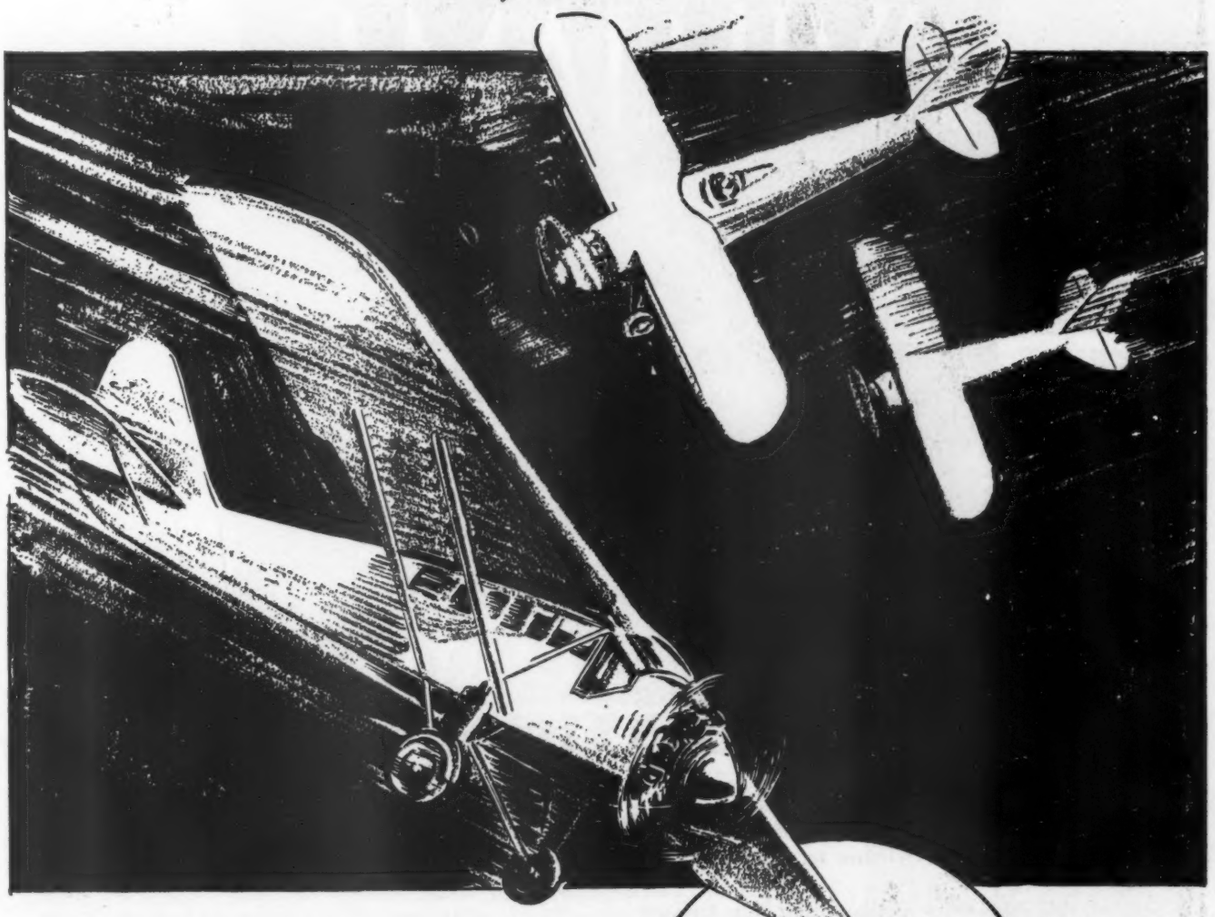
There is no better testimonial to the superior combination of mechanical properties, the high strength per unit of weight, and the uniform dependability of Nickel Alloy Steels than the fact that they are used for highly stressed parts of leading aircraft engines all over the world.

Nickel
FOR ALLOY STEEL

SEND FOR LIST OF AVAILABLE PUBLICATIONS ON NICKEL AND ITS ALLOYS

THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL STREET, NEW YORK, N. Y.

FLY SAFELY with Gulfpride OILS



AMERICA'S FINEST AIRCRAFT OILS

Measured by all standards of comparison, GULFPRIDE OILS demonstrate their superiority.

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SECURE

Lowered maintenance and operating costs.
Smoother operation.
Greater assurance of safety.

By insisting on GULFPRIDE OILS for your plane.

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WEDELL-WILLIAMS

Chooses HEYWOOD STARTER

For Dixieland's 365 Flying Days A Year

Service—unfailing service—was imperative.

For Daily Passenger and Express Routes from the World Port of New Orleans to distant inland Terminals—

For scheduled runs from metropolitan New Orleans to the beaches and resort playgrounds of the great blue Gulf—

For work with experimental racing planes that are shooting at World's Records, where just good enough is by no means nearly good enough—

For the ships devoted to primary and advanced student training—

For the ultra-dependability that is demanded alike by the routine of multi-stop schedules and the exactions of experimental research—

For all of these, Wedell-Williams needed *the* best. That is why the South's leading air service choose Heywoods.

In luxuriously appointed cabin transports and in amphibian air yachts, in flashing business fly-abouts and in the slim racing projectiles of their testing fields, Wedell-Williams have installed 15 Heywood starters to date.

SKY SPECIALTIES CORPORATION, 3651 Hart Avenue, DETROIT, MICHIGAN

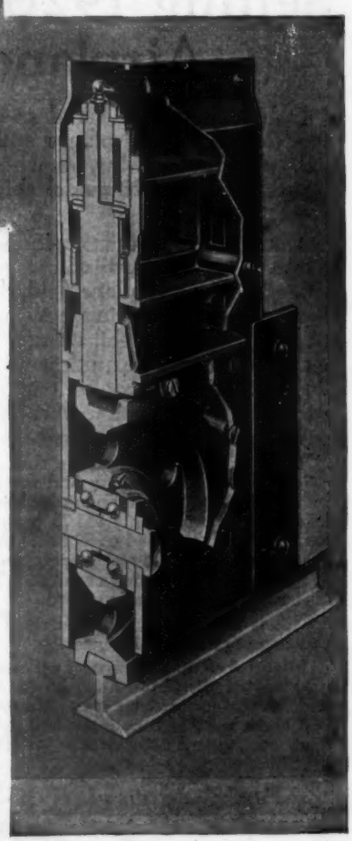
SKY SERVICE

Hangar doors slide smoothly and easily

The R-W top guide roller

"Quality leaves its imprint"

R-W bottom rollers fit standard (12" x 20") slots on steel and wood doors. R-W bottom roller No. 574 for "round-the-corner" hangar doors is shown. Side plates are integral units with no springs or other intricate parts to break or get out of order.



on R-W hardware-

Correct engineering is just as essential for ground equipment as for flying equipment. Profits in aviation depend on both.

R-W hardware insures continued smooth, easy, trouble-free performance of hangar doors, because R-W hardware is specially engineered to do that particular job.

R-W rollers are ball bearing, Alemite-equipped and weather-stripped. They are designed for corner tubular, structural steel, and heavy wood doors weighing up to 3000 lbs. each. Specify R-W equipment for "round-the-corner" doors and for straight sliding doors. Have an R-W engineer cooperate with your door manufacturer. Use freely the experience and knowledge of the R-W engineering staff, comprised of recognized doorway specialists. Write for folder F-62 featuring R-W hangar door hardware.

Richards-Wilcox Mfg. Co.

"A HANGER FOR ANY DOOR THAT SLIDES"

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50 years 1880 1930

Straight Talks to Airplane Dealers . . . No. 1

Are You Still in the HORSE AGE Selling 1920-Model Airplanes?

Dobbin is dead . . . and so are a great many models of light airplanes still stored away in hangars, awaiting buyers who will never buy! You can't sell 1920-model ships in this year of grace, 1930!

With the entire aviation industry going through a transition period, this fact is particularly noticeable: in the light 'plane field, the science of aerodynamics is producing new and more efficient designs . . . lighter ships, faster ships, ships capable of performance undreamed a few years ago. Powered with air-cooled engines, these modern light 'planes will almost carry their weight in passengers, fuel and baggage.

The Inland Sport is such a ship. On a recent 2,865 mile flight to Mexico City and return an Inland Supersport weighing only 880 pounds carried 690 pounds gross load . . . consumed only $53.72 worth of gas and oil . . . made an average speed of 99 miles per hour. This is the ship which holds the world speed record for light 'planes at better than two miles a minute. This is the ship which set an American altitude record.

This is the sort of ship you need to sell, nowadays if you expect to stay in business!

Inland Aviation Company will soon complete its plan of national distribution . . . based on the fact that *the modern aviation merchant must have modern goods to sell.* If you are a *merchandiser,* interested in selling airplanes for *sport, training* and *transportation,* write for the Inland Dealer Franchise Plan.

Further details gladly sent on request.

INLAND SPORT

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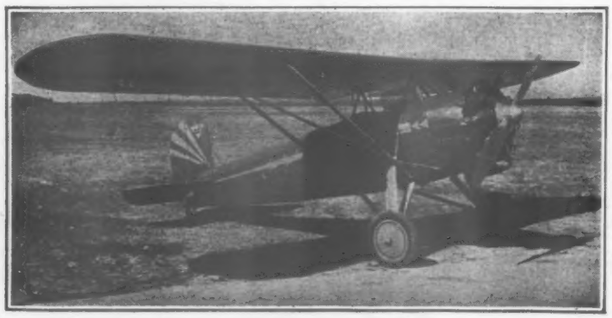
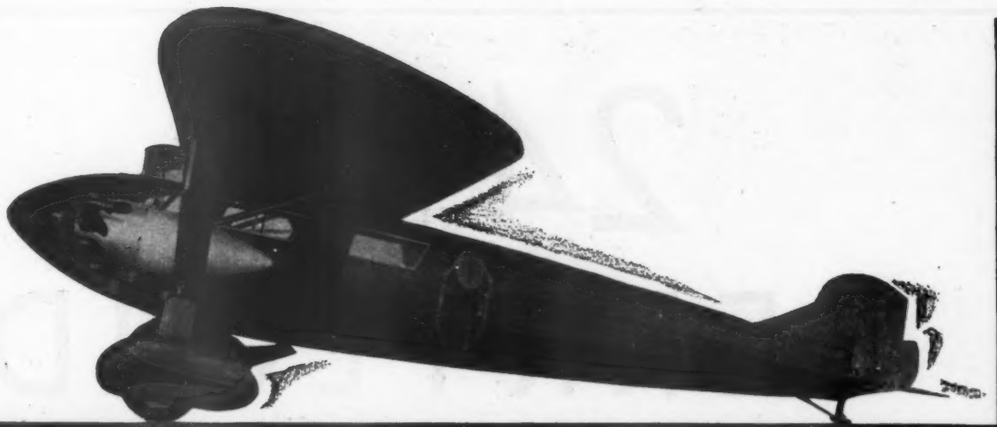
KANSAS CITY, KAN.

INLAND SPORT MONOPLANE

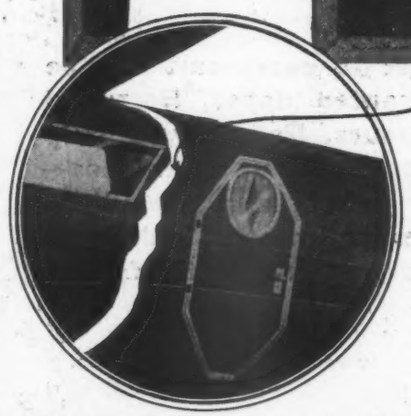
"TOMORROW'S PLANE TODAY"

Manufactured at Fairfax Field under Approved Type Certificates No. 259 and 315





FELT



for cabin and floor insulation

The Felters Company manufactures a number of FELTS which are excellent for insulating purposes. Felts made of raw materials carefully selected, and manufactured to the most exacting specifications, producing a material of unusual density.

We also produce Felts for other aeronautical purposes; each chosen for the particular work required. Felt can be furnished in bulk, or in finished parts cut to exact dimensions. Three large factories, modern cutting plant, and nine branches assure prompt service.

We will gladly submit samples, quotations and suggestions. Kindly send inquiries to Advisory Dept.

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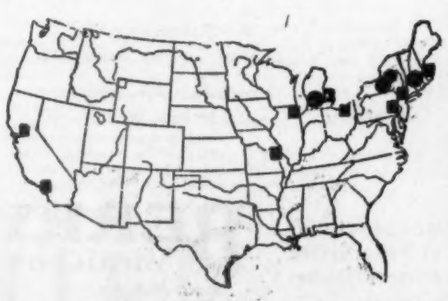

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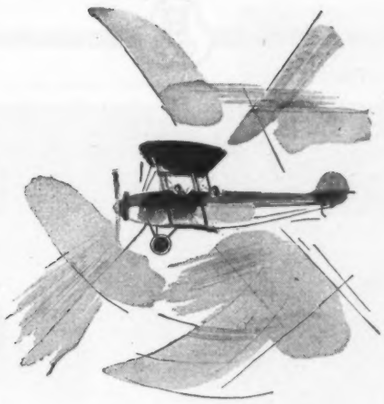


Climb . . . speed . . . responsiveness . . . strength . . . price

FAIRCHILD KR BIPLANES are made for the average man, not for the perfect pilot—because there are no perfect pilots. This average man may have many or few flying hours; he learned to fly easily, not because of some unusual special ability, but because it is easy to learn, and an interesting and swift way of getting about. He wants a ship that he can take off small or muddy fields with confidence rather than hope; one that will respond to all the demands he makes of it; and that is strong enough to stand the occasional hard landing. And finally, any ship he buys must match his pocketbook in purchase price and cost of operation.

In the two Fairchild KR Biplanes the average pilot has just such ships. They are unusually easy to fly, and highly responsive to the controls. They will climb at the rate of 800 feet per minute and better. The most rigid specifications are followed in design and manufacture. All welds are in shear, not tension. Chrome molybdenum steel is liberally used, for its extra strength combined with lightness.

Particular attention is called to the new low price of the KR-21, now available in Trainer and Sportster equipment. Considering take-off, speed, maneuverability, sturdiness and completeness of equipment, these ships at their respective prices are unusually good buys. Note the completeness of the equipment, which means that the flyaway price can represent your entire initial investment. Illustrated booklet giving full information sent on request.

FAIRCHILD AIRPLANE MANUFACTURING CORP.
FARMINGDALE, LONG ISLAND, NEW YORK

Plants: Farmingdale, N.Y.; Hagerstown, Md.; Longueuil, P.Q., Can.

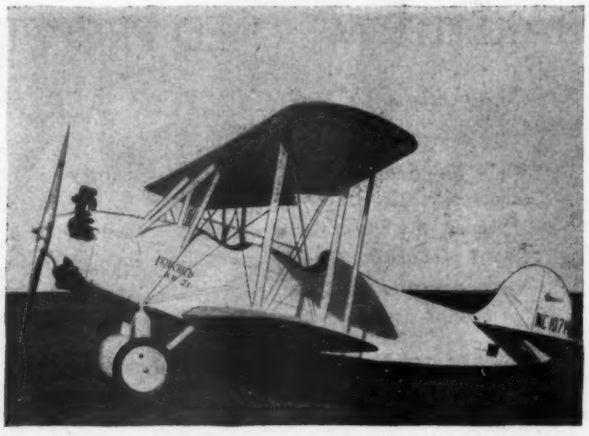
Export Offices: 122 East 42nd Street, New York City

Division of The Aviation Corporation

FAIRCHILD KR-34 **A.T.C. 162** **Three place**

Performance: Top speed, 123 m.p.h. Climb, 800 ft. p.m.
DISPOSABLE LOAD, 885 LBS.

Specifications: Wright J-6, 165 h.p. engine and metal propeller. Oleo landing gear. Bendix brakes may be installed at slight additional cost. Air wheels with brakes also obtainable at slight extra cost. Note really complete equipment: airspeed indicator, altimeter, compass, dash gasoline gauge, booster magneto, tachometer, dual controls, brakes, oil pressure and temperature gauges, cockpit covers, engine cover, logbook, tools, first-aid kit, fire extinguisher, engine instruction book, wired for navigation lights. This plane can also be had with 165 h.p. Comet engine, which alters performance slightly and increases disposable load and economy. Price, with either engine, $6575 flyaway Farmingdale.



FAIRCHILD KR-21 **A.T.C. 215** **Two place**

Performance: Top speed, 113 m.p.h. Climb, 775 ft. p.m.
DISPOSABLE LOAD, 535 LBS.
KR-21 *Trainer*, $4125 flyaway Farmingdale

Specifications: Kinner 100 h.p. engine and wood propeller. Oleo landing gear. Bendix brakes may be installed at slight additional cost. Air wheels with brakes also obtainable at slight extra cost. Complete equipment: altimeter, gasoline gauge, booster magneto, tachometer, oil pressure and temperature gauges, dual controls, engine cover, tools, fire extinguisher, first-aid kit, engine instruction book, logbook, celluloid inspection windows at all control bearing points, detaching pan.
KR-21 *Sportster*, $4375 flyaway Farmingdale. Same equipment as the Trainer plus upholstery, extra oil pressure gauge, compass, airspeed indicator, propeller spinner and cockpit covers.

FAIRCHILD

KR BIPLANES

Ball Bank Indicator, with case of Bakelite Molded. Made by Emil Daiber, Cleveland Ohio.

BAKELITE MOLDED PROVIDES UNVARYING ACCURACY

REQUIRED FOR AERONAUTICAL INSTRUMENTS

In a ball bank indicator, extreme accuracy in all dimensions is essential to accuracy in indication. Forming the indicator casing of the Daiber instrument of Bakelite Molded made uniform accuracy a certainty, and also assured parts which were light in weight, non-hygroscopic and non-corrodible.

Formed in one press operation, these Bakelite Molded cases are uniform in all dimensions when removed from the mold, and no subsequent machining operations are required. Recesses for the "filled" numerals, and all of the necessary screw holes are completed in the molding operation. The lustrous finish is also acquired in the mold and remains undimmed through years of service.

Strong, light in weight and durable, and possessing excellent insulating properties, Bakelite Molded is well adapted to the requirements for insulation parts of aircraft electrical equipment, and to the production of accessories and instruments.

Manufacturers are invited to enlist the cooperation of Bakelite Engineering Service. Write for Booklet 59M, "Bakelite Molded".

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BAKELITE CORPORATION OF CANADA, LIMITED, 163 Dufferin Street, Toronto, Ontario

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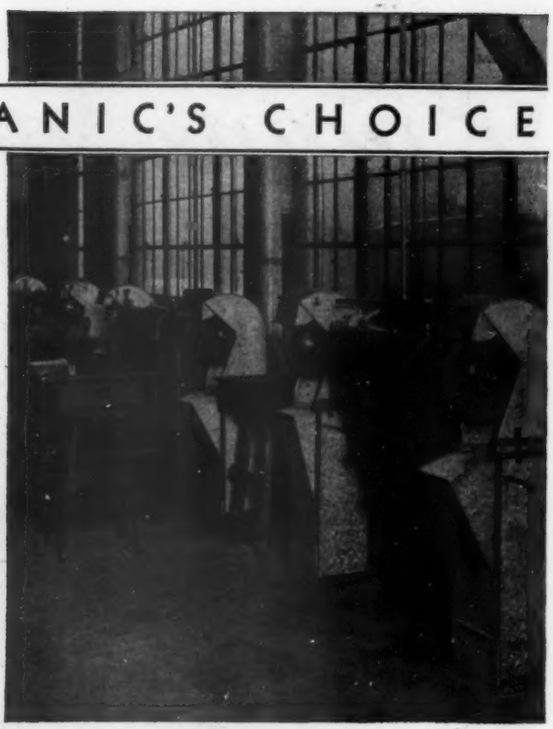
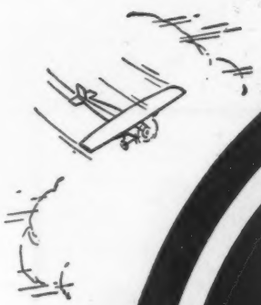
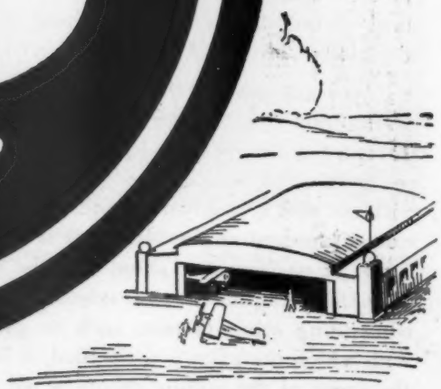




JUST as Curtiss planes and motors have been known for their exceptional records from the beginning of aviation activities, so have U. S. Buffers and Polishers been famous over an even longer period. But outstanding accomplishments are possible only with outstanding engineering principles behind them. And it is these factors which make U. S. and Curtiss the choice of so many buyers in their respective fields. These plus the economical, dependable performance of U. S. Buffers and Polishers under long, severe service are setting new records for low cost, big volume production in more and more shops everywhere. There is a type in the broad U. S. line which can set new records in practically any service. Why not learn what improvements you may be able to make? There's no obligation for finding out. Simply ask your jobber or write us today.



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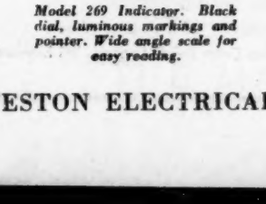
Model 544—a small refined generator screwed directly onto the tachometer coupling on the engine. The voltage generated is transmitted by cables to an indicator, scaled to read in R.P.M.,—located on the instrument panel.

The Model 544 affords absolute assurance of speed control. It indicates speed variations instantly, smoothly and accurately. It is a new application, but not a new principle. For many years Weston electric tachometers have been used with marked success throughout industry and in the railway and marine fields, and the same dependable service is now available for every type of aircraft. Investigate. Let us acquaint you with the present applications to mail and passenger planes.



Model 269 Indicator. Black dial, luminous markings and pointer. Wide angle scale for easy reading.

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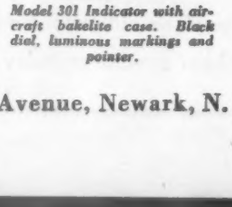
INSTRUMENTS



Model 301 Indicator with aircraft bakelite case. Black dial, luminous markings and pointer.

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GOOD airplane steels cannot be supplied from stock. Rather, they must be specially developed, and manufactured with infinite care and skill, in accordance with the exact nature of the task involved. Throughout the special department which Bethlehem devotes to the manufacture of "Airplane Quality" Steels and Forgings this principle is held as fundamental. It is a governing factor in Bethlehem's success in meeting the requirements of the aeronautical industry.

Bethlehem's experience in developing and manufacturing steels and forgings for builders of aircraft engines dates from the beginning of the aeronautical industry. Many of the greatest flights in the history of aviation were made by planes with Bethlehem "Airplane Quality" Steels and Forgings in vital parts of their engines.

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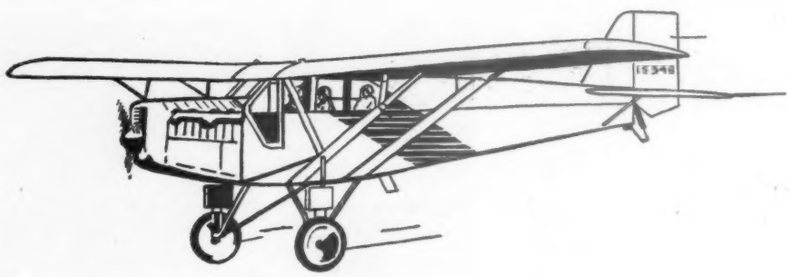

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New planes are being built, new records will be made and the quality trend is toward NASHAWENA Airplane Fabric.

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The sales of NASHAWENA Airplane Fabric for the first one hundred days of this year increased 98% over the same period last year. This indicates that airplane manufacturers and airplane owners are becoming more interested in selecting durable quality.

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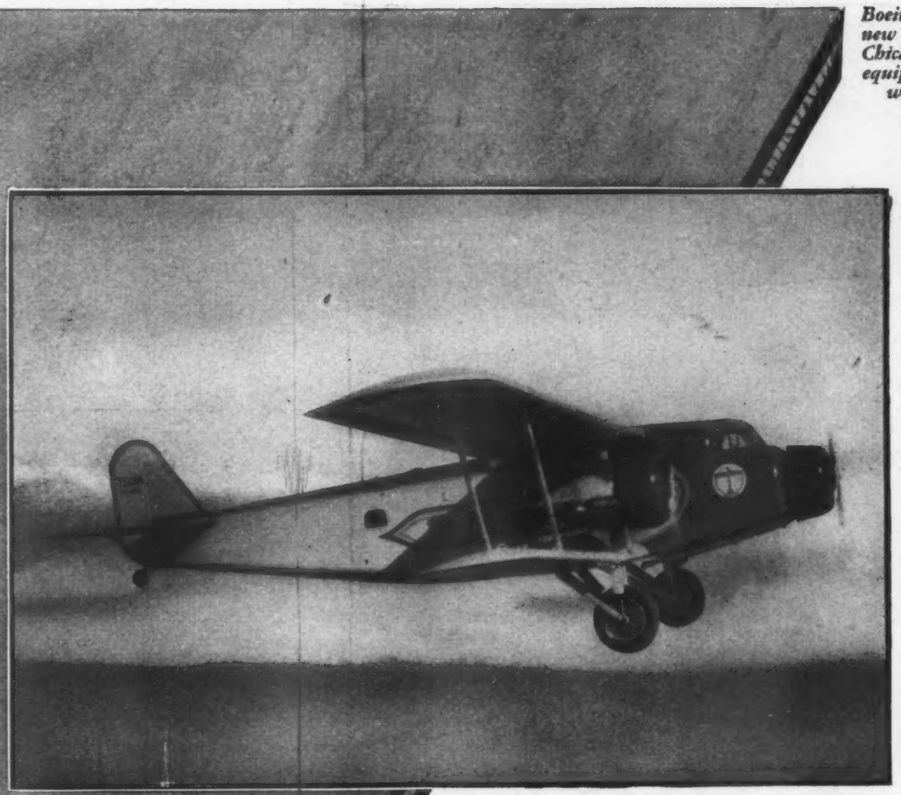

Boeing 18-passenger ship, for new transport service between Chicago and San Francisco, equipped with Haskelite plywood (Lata Balsa core).

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adds passenger comfort to other requirements of speed, safety and endurance.

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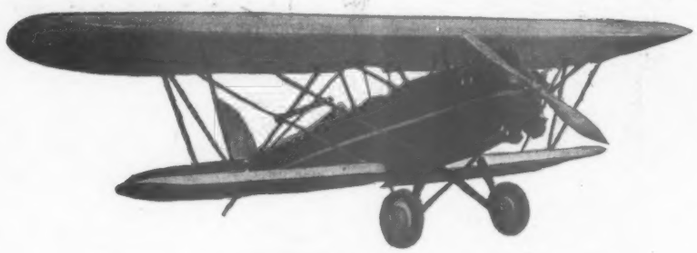

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Name the ship . . . with the same horsepower . . . that can compare with the "Bird" in performance, stability, construction and appearance.

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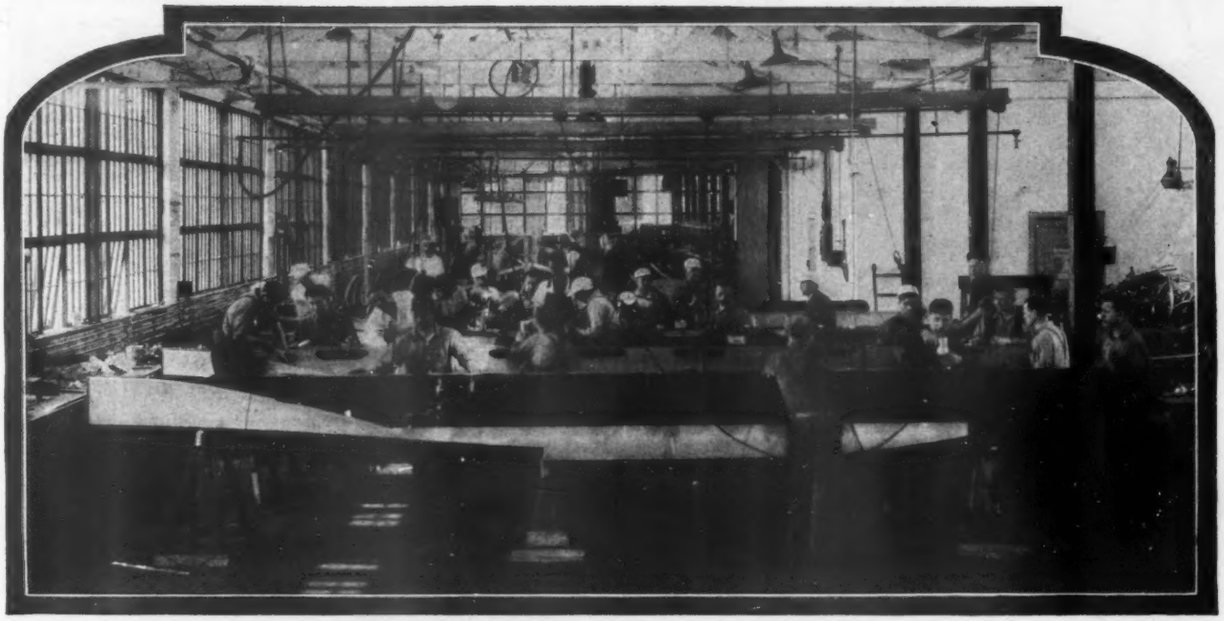

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Cruising Range: 450 miles (4½ hrs.)

Quick take-off; slow landing: Takes off in 15 seconds after 750 ft. run. Lands at 59 m.p.h.

Power plant: 1 Pratt & Whitney 450 H.P. "Wasp" engine.

Actual pay load: 5 passengers and baggage (913 pounds).

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Mahogany Plywood Hull: Eliminating possibility of danger of salt water corrosion and materially reducing maintenance cost.

Completely equipped: No extras to buy, no weight to add.

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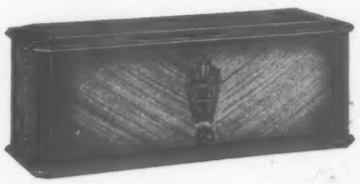

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Model AR 594C

105 to 125 Volt, 50 to 60 Cycle Alternating Current Operation

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A dual dial compass with both vertical and horizontal cards whose markings and graduations coincide. By this unique dial arrangement, reading of both dials is made from the same indicating point. A decided advantage over double card compasses with markings opposite or 180 degrees apart making it necessary to take readings at opposite points of observation. Type BU is the same as type B, but with indirect lighting from below. Height, 4⅝ in.; width at base, 6½ in.

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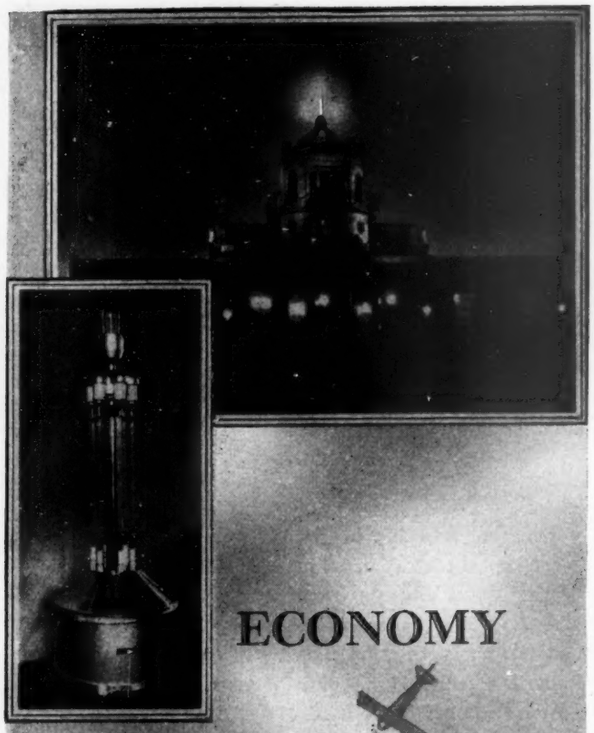

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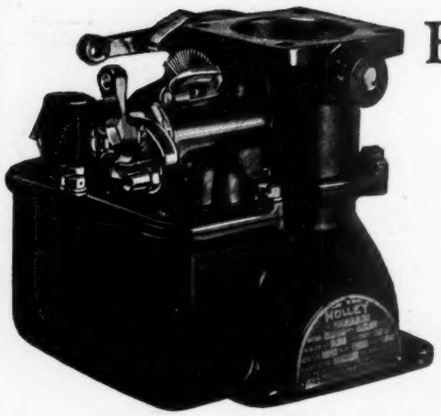

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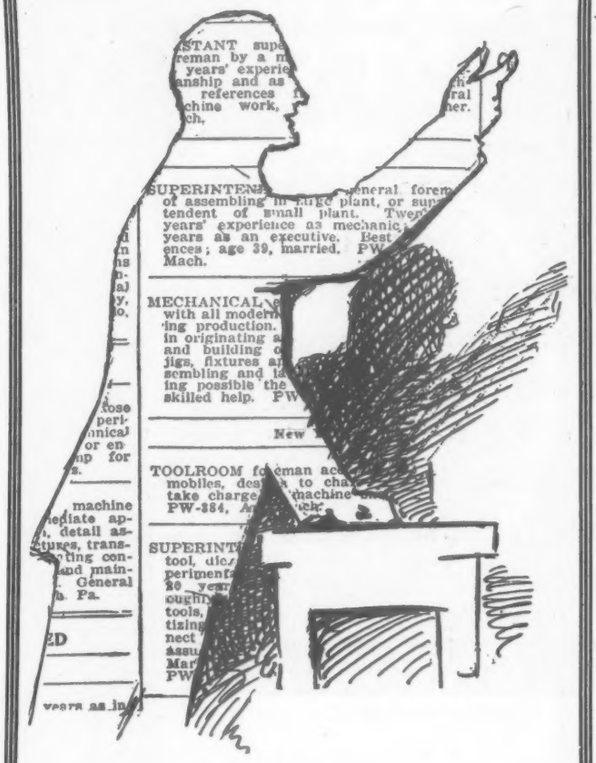

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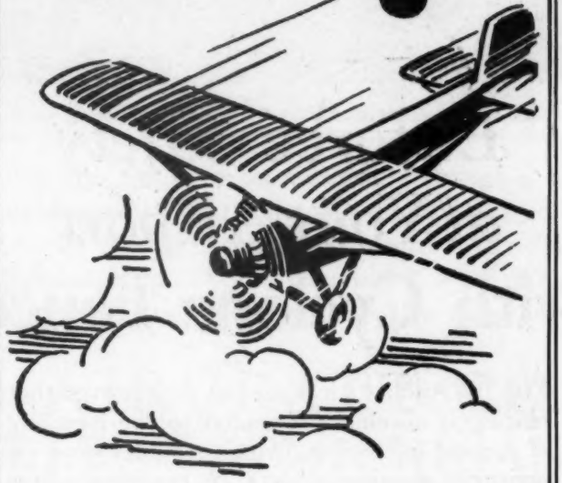

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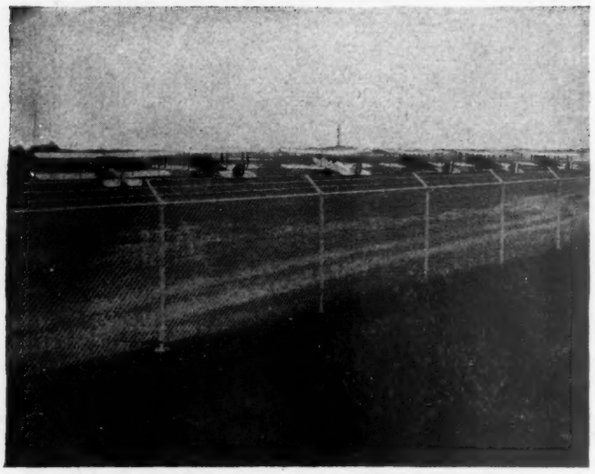

Enforce Safety at Your Airport with Cyclone Fence

The 5th Annual Air Tour last year proved that fencing is absolutely essential to the handling of crowds at airports. Many troubles were experienced at open airports. A magazine editor reporting the tour said "Crowds invaded the fields as soon as planes had landed. They milled heedlessly about while engines were being warmed up and the absence of fatalities can be accredited only to providential intervention."

But where airports are fenced, crowds are always out of danger, adding to the safety of both fliers and spectators.

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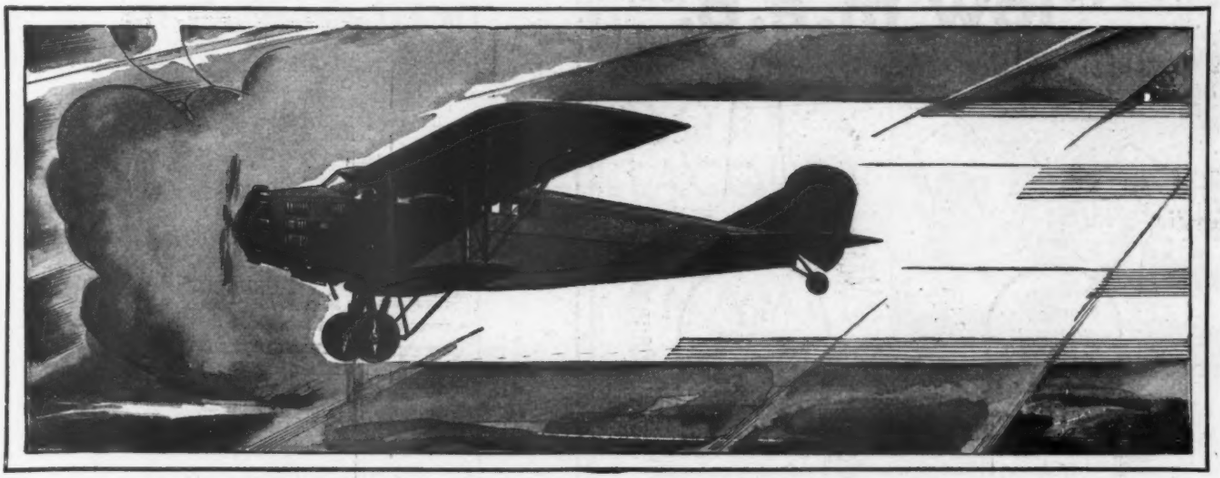

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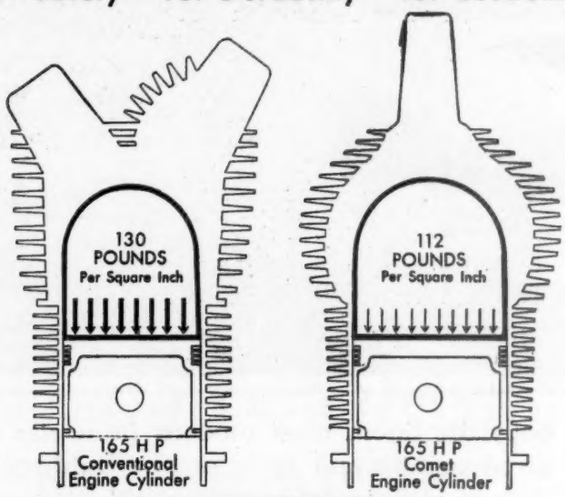
COMET

"low m.e.p."

for Safety—for Durability—for Economy



"Force is Pressure Multiplied by Area"

The above sketches show how the Comet low m. e. p., large displacement cylinder develops the same power with less strain than another cylinder of less displacement and higher m. e. p. But Comet weight per horsepower is no greater, because simplified design saves weight which is put back on wearing parts.

Roll your Comet-powered plane out of the hangar—load up, and fly away. Do it every flying day for a year—or more. Have the valve clearances adjusted every 50 hours—or do it yourself—it's easy. Take care of oil and greasing. You will not need an overhaul for 300 to 500 hours. Durability (economy) is another advantage of Comet power.

Why?

When an engineer designs an automobile engine he gives the wearing parts plenty of reserve strength so they can do their work at ease, without strain. He also designs for low m. e. p. (brake mean effective pressure)—as low as 100 pounds pressure per square inch—so the engine *cannot* be made to work as hard as it *could* work. That is one reason why automobile engines last a long time with low upkeep costs.

But aircraft engine designers have followed the wartime practice of making their engines work at or near their utmost capacity. Conventional aircraft engines, without supercharging, run as high as 120 to 135 pounds per square inch, on the theory that the utmost power must be obtained from the least weight of metal. So durability—reserve strength—is sacrificed for maximum attainable power. The result is expensive maintenance and parts replacements, with the possibility of failure and resulting delays.

Comet sacrifices neither durability nor performance. Durability is attained by building into the vital parts of the engine—the wearing parts—the weight saved in the simplified valve mechanism and cylinder head. Performance is accomplished by providing an unusually large cylinder displacement which permits holding the brake mean effective pressure to a modest figure—112 pounds per square inch.

Durability—another reason why Comet owners are

at ease in the air

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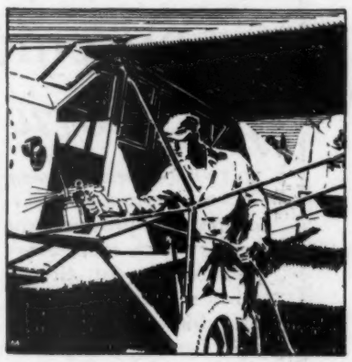

Not only in the aircraft plant, but at the airport as well, this newer and quicker spray method is steadily supplanting slow, laborious hand work.

Lacquers, enamels, dope can be applied with Brunner-Air in a quarter of the usual time. But besides saving hours of a mechanic's or painter's time, this up-to-date method makes it possible for the less skilled hand to lay on an even coat of material and reach areas inaccessible to the brush.

Two popular spray guns are shown here. Model 400 is a light duty instrument, holds a pint, and is generally used for touch-up and light paint spray . . . Model 300, the all-duty gun, can be used with nearly all paint materials from lacquer to heavy asphaltum paint. It is sturdily built, light in weight, and has a quart spun-aluminum cup. Adjustments can be easily made for round or fan spray.

SPRAY GUN
Model 400

SPRAY GUN
Model 300

Aircraft Division
BRUNNER MFG. CO.
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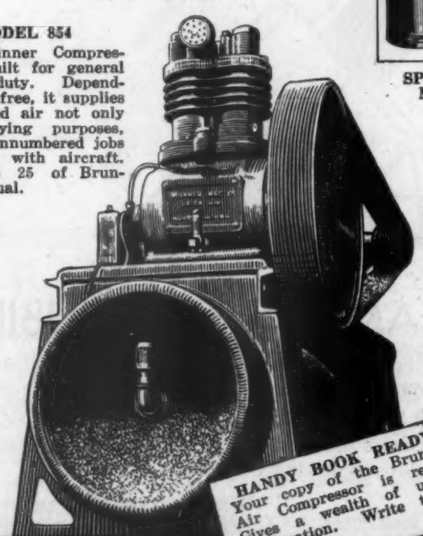
MODEL 854
This Brunner Compressor is built for general airport duty. Dependable, carefree, it supplies compressed air not only for spraying purposes, but for unnumbered jobs connected with aircraft. See Page 25 of Brunner Manual.



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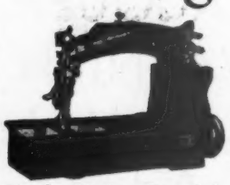

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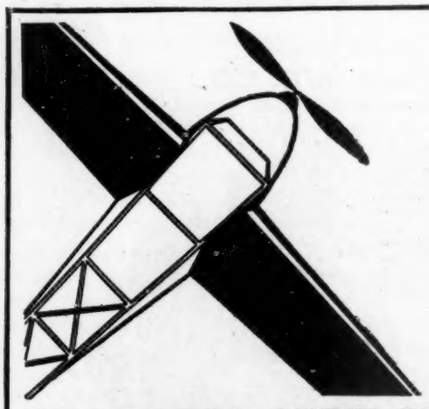

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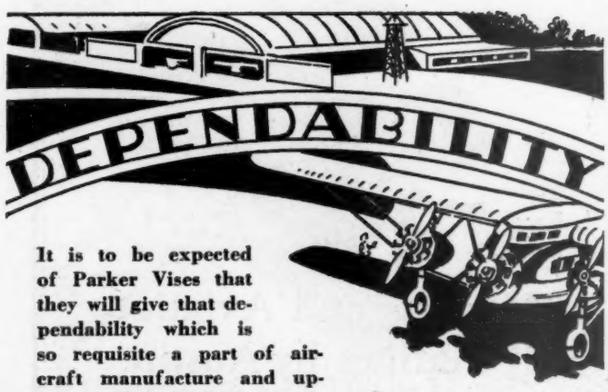

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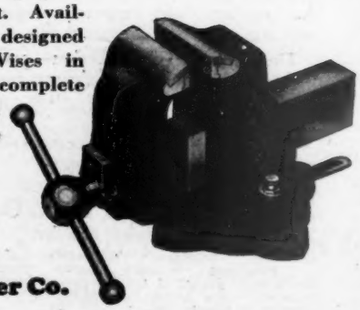

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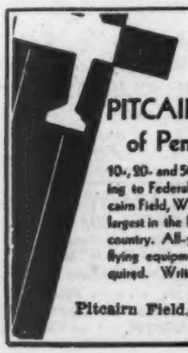

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4 place with 225 H.P. J-6 Wright Motor. Almost new, only 40 hrs. Reason for selling, intend to purchase 300 H.P. Stinson Junior. Will sell at a real price for a quick sale and cash only.

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Jefferson 1101

FOR SALE

MAGNETOS—Brand new Simms 8-cylinder for Curtiss, OXX-6, Hisso, and others. Each $22.50. Parts for all kinds of magnetos. Charles Stern & Co., 817 Washington Blvd., Chicago, Ill.

MOTORS, motors, motors. 1 J-6 300 hp. Wright Whirlwind motor, new. 2 J-6 165 hp. motors, slightly used. 2 J-5 Wright Whirlwind motors, completely overhauled. 2 J-4's, in perfect condition. 2 Warner Scarab motors, used 10 hours. 1 Leblonde 90, same as new. 1 180 Hisso, completely rebuilt. 1 new OXX-6, never used. 3 OXX-5's, overhauled. Standard steel propellers with each of these Wright Whirlwind motors. Michigan Aero Motors, Jackson, Mich.

OX-5 Pheasant, dual control, good serviceable condition, privately owned; ideal to build hours; $1,000; consider car part payment. Also OX-5 Standard, good condition, with or without motor. Hamilton Airport, Hamilton, Ohio.

OX-5 motor in good condition, turns 1,400. Two extra cylinders. $250. Marssford Ernling, 3542 Chope Pl., Detroit, Mich.

PARACHUTES, new and used, rope ladders for stunt men, etc. Specify weight. Thompson Bros. Balloon and Parachute Co., Aurora, Illinois. Established 1903.

BYAN Brougham in good condition, motor recently overhauled. Bargain prace. Cleveland Pneumatic Co., Cleveland, Ohio.

STINSON Detroiter, 8-place ship, 425 hp. Wasp used approximately 50 hours. Good as new. Bargain. Must sell. P. O. Bacon, 1579 East Milwaukee Ave., Detroit.

TRAVEL AIR NC 6003, just overhauled, $1,550. Travel Air NC 4258, just overhauled, $1,350. Pitcairn NC 978, OXX-6 motor, two Scintilla magnetos, $1,000. Lincoln Page No. 995. These planes will be sold on or before May 15th to the highest satisfactory bidder. Westchester Airport Corp., Armonk, N. Y.

WACO 220T, Special Chicago Show Job. Licensed, NC9531, Pioneer Compass, Bank & Turn, Rate of Climb, 250 hours, never cracked, forty hours since motor overhaul. $5,500. J. L. Moss, Jr., 1116 Marquette Building, Chicago, Illinois.

WACO 90 license NC 6939 OX-5; 85 hours on ship and motor, never cracked, private flown, dual controls, never used, motor turns 1,400 ground, just overhauled, new rings and valves. Silver wings, maroon fuselage, red struts and landing gear. Like new. Will sacrifice for $1,600, terms. Everett Wiegand, Woodriver, Ill.

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Write it as the first word of your ad.

If it is a Position Wanted or Position Vacant ad, make the first word the kind of position sought or offered.

This will assure proper classification in the column.

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FOR SALE

SAVE THIS AD. OXX-6 Curtiss, overhauled, new parts where needed, Splitdorf magnetos, propeller, tachometer, altimeter, all for $400. Al Striegel, Box 1002, Joliet, Ill.

EQUIPMENT WANTED

PARTY in eastern Pennsylvania will pay cash for licensed three place OX-5 plane; also used parachute; must be reasonable. EW-523, Aviation, Tenth Ave. at 36th St., New York.

WANTED: Curtiss Reed Pusher propeller for Sea Gull flying boat, also complete Sea Gulls or any parts thereof. Must be cheap for cash. EW-524, Aviation, Tenth Ave. at 36th St., New York.

WANTED: Light 2- or 3-place ship equipped with pontoons. Must be licensed as seaplane, and a bargain for cash. Wire or write. H. P. Sheard, 1901 N. Cedar St., Tacoma, Wash.

WANTED: Heath Henderson motor and propeller. Give details first letter. E. L. Blair, Box 445, Ocala, Fla.

WANT propeller for OXX-6 motor, also parachute, weight 200, also motorcycle engine. State price and condition first letter. Tonnele Co., 195 Tonnele Ave., Jersey City, N. J.

WANTED: Waco 9 fuselage or front half. Must be okay and cheap for cash. Or will sell parts I have or trade for good OX-5 motor. E. Burlingame, 1459 No. Holton Ave., St. Paul, Minn.

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WANTED experienced dye caster—must furnish references. P-514, Aviation, 632 Chamber of Commerce Bldg., Los Angeles, Calif.

WANTED: Engineer and analysis man, also working foreman capable of handling all jobs, must be good instructor, exceptional opportunity. MacDonald & Dwight Huntington Wire, Major Aircraft Corp., 129 Grand Ave., Brooklyn, N. Y.

WANTED: Instructor for mechanics school. Good personality, energetic. Good opportunity for right man. State experience, reference and salary desired first letter. Robbins Flying Service, Akron, Ohio.

WE wish to secure the services of a recent Engineering graduate who is familiar with the various phases of Aeronautical Engineering to teach these and related subjects. W. H. Carson, University of Oklahoma, Norman, Oklahoma.

POSITIONS WANTED

AERONAUTICAL engineer, university graduate, experienced design and construction, three years landplanes, four years metal and wood seaplanes, desires reliable connection as project or production engineer; at present in charge of engineering with leading aircraft manufacturer; available next June. PW-519, Aviation, Tenth Ave. at 36th St., New York.

AIRCRAFT executive will be available May 10; experienced in aircraft design, stress analysis, and low cost production; graduate engineer; age 32; salary $6,000; references as to honesty, integrity and ability will stand closest investigation. PW-521, Aviation, 520 No. Michigan Ave., Chicago, Ill.

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Aircraft Manufacturing Corp., will train, days or evenings, limited number of accepted men for positions in their plant. Training fee required which is returnable with wages on qualification.

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LICENSED pilot with practically new OX-Waco, open for any reasonable proposition, will consider investing capital. John Walsh, 9427 210th St., Bellaire, L. I., N. Y.

LIMITED commercial; give good reference as to character and experience; high school and two years of college education; make me any offer. Write W. L. Trimble, 1319 Holmes St., Kansas City, Mo.

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TRI-MOTOR transport air mail pilot, ex-army officer, college graduate, twelve years military and commercial, all types, day and night, over five thousand hours, five hundred on trimotors. Now flying as senior Ford pilot on one of largest lines. Desire change offering opportunities. PW-525, Aviation, 520 No. Michigan Ave., Chicago, Ill.

TRANSPORT pilot wishes position, will go anywhere. Careful and reliable, good references. Single. Engine and airplane upkeep experience. PW-508, Aviation, Tenth Ave. at 36th St., New York.

TRANSPORT pilot, now employed, desires change; most of time flying Pennsylvania hills; will fly anything anywhere with chance of advancement. PW-520, Aviation, Tenth Ave. at 36th St., New York.

TRANSPORT pilot desires connection with reliable company. Sales and general office experience. Also college work. Never crashed. Available immediately. Will go anywhere. Lewis W. Lichty, 176 Gates Street, Waterloo, Iowa.

TRANSPORT pilot wishes position. Married, age 29. Experience over 1,200 hours. 100 hours co-pilot on Ford Tri Motor. Instructor Florida last winter. Available now. Can furnish satisfactory references. Box 222, Wisconsin Rapids, Wis.

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THREE widely experienced aircraft builders and repairmen with full manufacturing equipment want to locate in good territory; gliders and experimental work a specialty; write immediately, BO-511, Aviation, Tenth Ave. at 36th St., New York.

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In southern city just becoming imbued with aviation, a complete business, aviation field leased, hangars owned, three ships, one Stinson biplane, two Wacos with OX-5 motors, one extra OX-5 motor, one lot J-5 parts, one lot ship parts; will sell together or separately; price a bargain; reason for selling, must devote time to other business. BO-522, Aviation, 520 No. Michigan Ave., Chicago, Ill.

MISCELLANEOUS

OX valve guides installed $1.50; OX valve seats installed, $1.00; 1 set OX5 cylinders like new, $70.00; 1 OXX-6 cyinders like new, $70.00; Berling Magnetos, OX5, $20.00. Illinois Flying Co., Sterling, Ill.

WE will sell, buy or exchange your airplane, supplies, motor or anything; list it with us. Give us full details. Wanted 35 hp. motors. Pennsylvania Aero Service, Dennick, Youngstown, Ohio.

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Planes are cheap to build and excellent for teaching, travel, sport and stunt flying. Meet the strictest qualifications of German Government. Can be equipped with 40 to 120 HP. motor.

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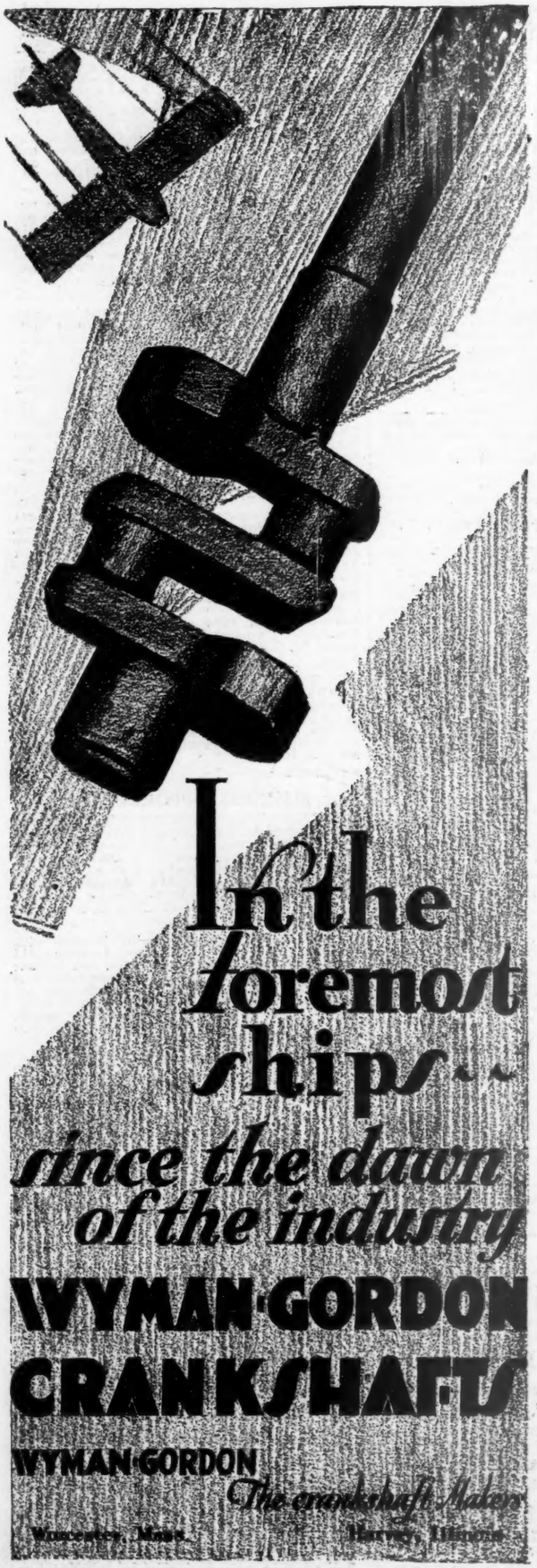

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Three 525 horsepower Pratt and Whitney Hornet engines provide power and speed. Two Scintilla Aircraft Magnetos on each engine insure dependable ignition for this fast 2000 mile trip.

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The Boeing, Model 80-A Tri-Motored Transport. Scintilla Aircraft Magnetos used exclusively.

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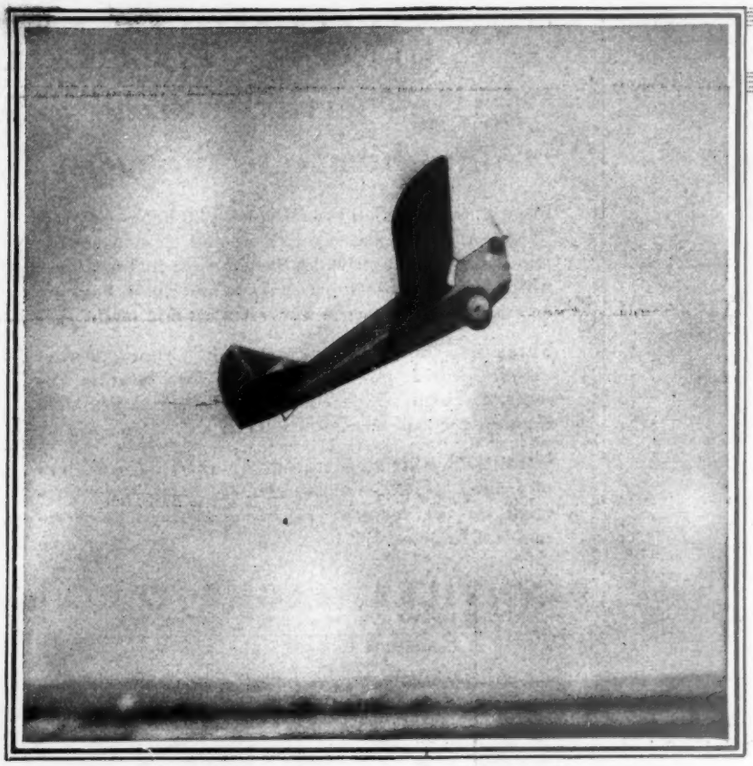

Announcement

The demand for the Aeronca C-2 has exceeded our most optimistic expectations. Actual orders have made it necessary to increase production to a point where it will probably exceed that of any other plane being manufactured today.

In keeping with our policy of pioneering the huge mass market . . . of building a plane which the average man can fly safely *and buy easily* . . . we take great pleasure in announcing that the Aeronca C-2 has been reduced from $1880 to $1495, Flyaway Cincinnati.

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Just three months ago the Aeronca C-2 was introduced to the aviation world. Its initial appearance quickly proved to even the most skeptical that it *was* possible to achieve glider safety and sport plane performance . . . a combination desired by all—especially the public.

At St. Louis, during the International Exposition, the Aeronca startled the industry by literally jumping off the concrete ramps after running seventy-five feet or less. Nearly a hundred different pilots took their first hop in it . . . and came down grinning with enthusiasm. The Aeronca's inherent stability, its rapid climb, its easy maneuverability, its eleven to one gliding angle and its 30 mile an hour landing speed had them sold . . . and then some. And when they witnessed that economy run . . . one hour and seventeen minutes on two gallons . . . the Aeronca was proclaimed the sensation of the show.

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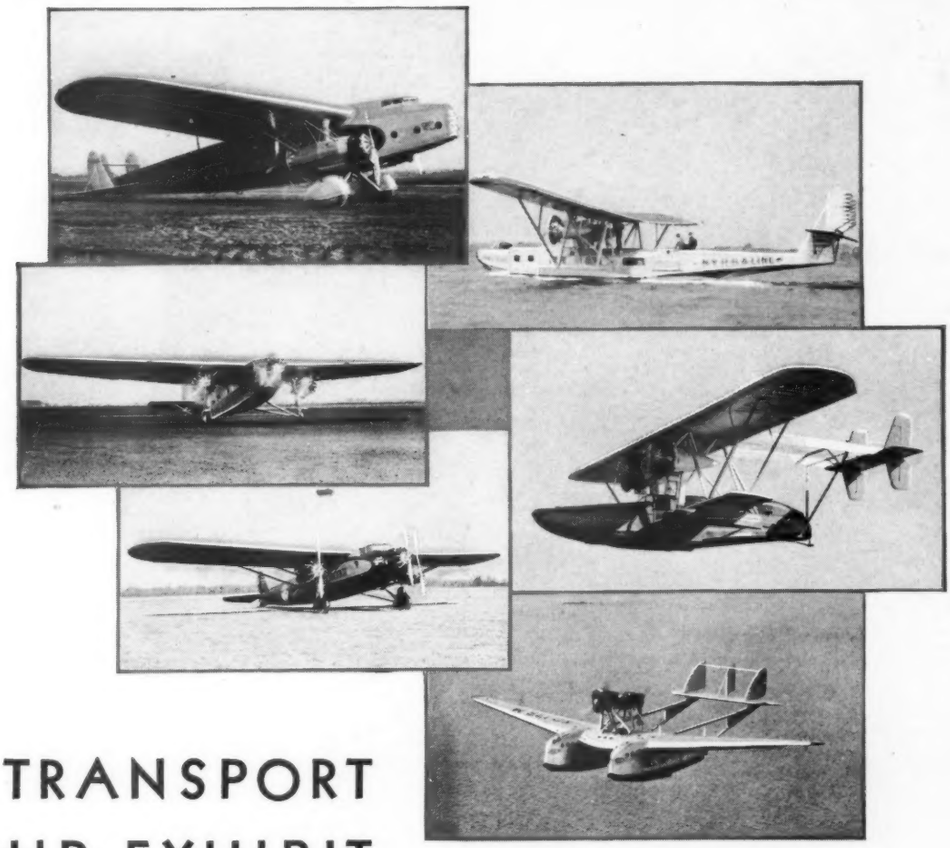

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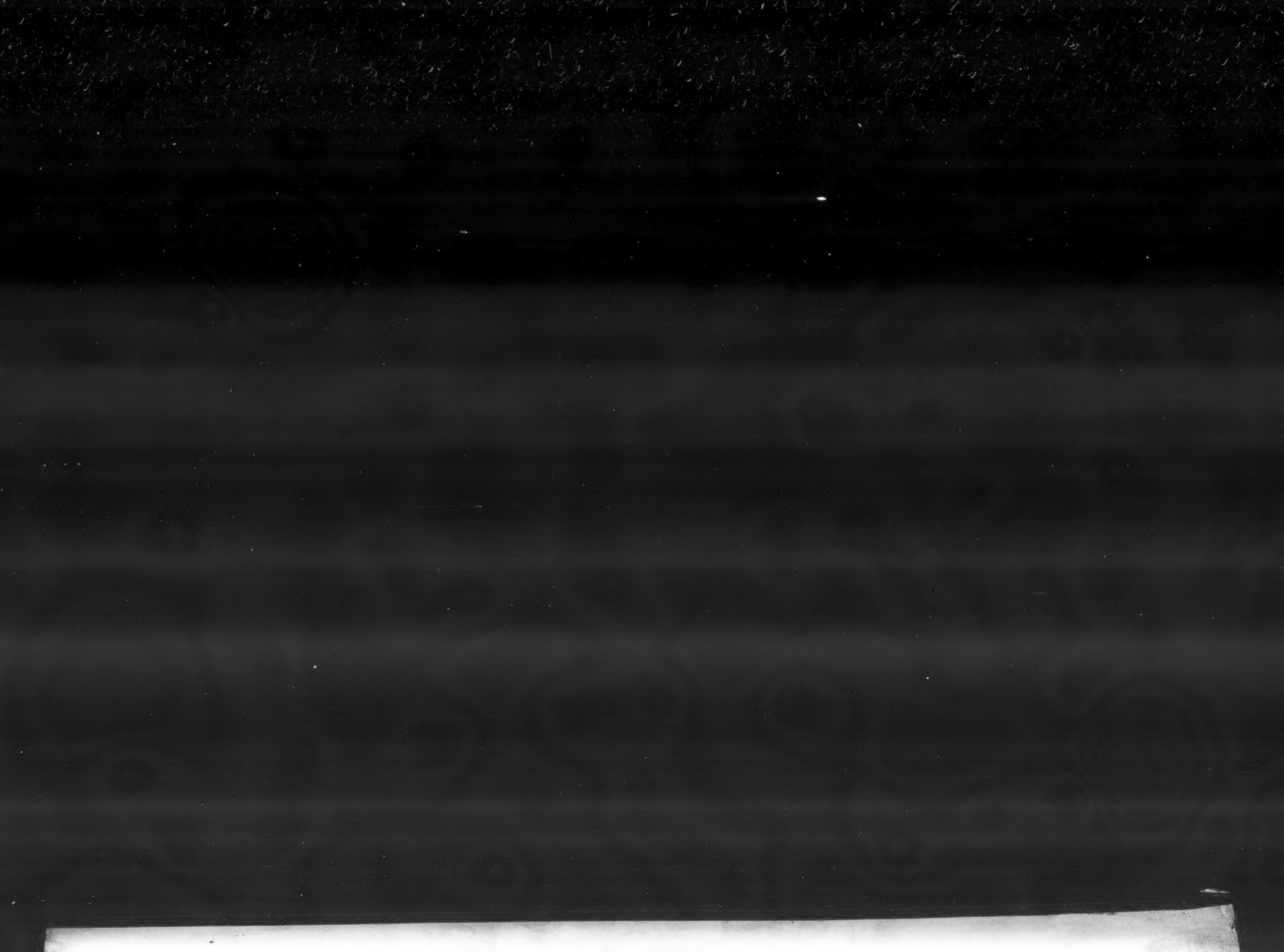
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